

Commission Recommendations February 2003

A. INTRODUCTION

For the IT Commission to be effective, it is critical that the process of performing the “as is” assessment and best practice research culminate in a final report that prescribes solutions, not just describes problems. The “as is” assessment process gave the IT Commission an understanding of the challenges facing the Commonwealth. The best practices research brought forward a number of innovative ideas for consideration. Both discovery processes served as a “level setting” for Commission members to make meaningful and realistic recommendations that can be implemented. This section of the report sets forth those recommendations.

The IT Commission met six times from November 2002 through February 2003.²⁹ IT Commission members’ recommendations were informed by IBM’s “as is” observations, by facilitated visioning sessions, and by volumes of best practice research. The non-profit Center for Excellence in Government sponsored a daylong roundtable discussion with former government CIOs, to provide an opportunity for Commission members to dialogue directly with practitioners about governance structures and management practices that have worked successfully in state government environments, and about lessons learned. These practitioners were unanimous in their praise of Massachusetts for the inclusive, enterprise IT framework being pursued by the Commonwealth, and for the active involvement of Commission members from all branches of government, as well as the private sector. The Commission was diligent in looking beyond the performance of peer states, to leading industry practices in the private sector. The Commission was mindful that all private sector best practices cannot be translated exactly into the public sector, largely because of dissimilarities in public sector organizational governance models. IT Commission meeting presentation materials and minutes are available on the IT Commission’s web site: <http://www.state.ma.us/itcommission>.

The outcomes from the Commission’s deliberations are presented here as recommendations for achieving an enterprise IT environment across all branches and levels of government, to the extent permitted by the Massachusetts Constitution. These recommendations are categorized to align with the IBM team’s “as is” observations. The Commission’s recommendations on Commonwealth security have been removed from this document and provided to the Commonwealth under separate cover. These recommendations are not available for public distribution.

²⁹ Appendix C contains a schedule of IT Commission meetings and topics.

B. GOVERNANCE

Massachusetts will require a truly collaborative, government-wide IT enterprise to realize the full capacity for IT investments to achieve high quality, seamless delivery of services for the Commonwealth's citizens and businesses. The IT Commission adopted the following statement as representative of members' views on the appropriate scope of the enterprise, and the necessity to work to transcend existing governmental barriers:

“Opportunities for taxpayer savings, expanded public services, and improved efficiency in the public sector, through IT reform, require us to go beyond traditional boundaries. Enterprise IT reform in Massachusetts, to the extent appropriate, should encompass all three branches of state government, state agencies, state authorities, cities and towns, and the Commonwealth's university and research community.”³⁰

In recent years, many states have begun to recognize that traditional models for administering and delivering IT services are inadequate for addressing the cross-jurisdictional nature of an effective IT enterprise. Budget shortfalls; constituent demands for faster, better, cheaper services; and post 9-11 pressures to meet new security standards have rendered traditional approaches to IT governance ineffective. Additionally, the pressures to utilize technology to meet new and emerging priorities in government only heighten the need for IT governance reform.

Instead of debating centralized versus decentralized authority and services, today's cross-jurisdictional IT enterprise demands a more federated approach to governance, one that has a unified strategy guiding:

- Common investments in enterprise infrastructure and resources;
- Enterprise policies, standards, architecture, and a management control framework that achieve interoperability, data and system integrity, security, and availability objectives; and
- Shared services founded on innovations in common business processes.

In a federated model, the utility functions of IT are managed centrally, but agencies continue to play a lead role in applying IT to improve business solutions through developing new business systems or reengineering business processes. For the federated approach to work, it is critical that key decision makers contribute directly to the development of a unifying framework, which synergistically links strategy, policy, and operations across entities in the enterprise. It is also important that the federated approach leverages existing assets, resources, and programs, and that it

³⁰ “Draft Recommendations from the IT Commission,” Massachusetts IT Commission Meeting, 22 Jan 2003.

expands and replicates them as “centers of excellence” throughout the Commonwealth.

IT governance has a pervasive effect on the success of IT initiatives and operations throughout the enterprise. During its deliberations, the Commission discovered that it could not single out a topic for discussion, whether it was infrastructure or economic development, without the conversation turning first to the subject of governance. This discovery reinforces the “as is” observation that Massachusetts has a weak IT governance structure. The Commission is committed to strengthening this structure, and empowering a newly created Office of the CIO with the authority necessary to succeed in managing the breadth of its responsibilities. The Commission recommends an IT governance structure appropriate to the cross-jurisdictional nature of the enterprise, one that will enable technology to transcend traditional boundaries to transform the business of government, and facilitate collaboration and strategic direction setting among key stakeholder groups.

States that are in the forefront of implementing an enterprise IT framework have achieved varying degrees of success in extending IT governance authority beyond the executive branch. Many are attempting to manage across boundaries through enterprise planning, enterprise architecture and policies, and budgetary and program management oversight of IT projects. Most of these states are mandating cooperation within the executive branch, and offering to provide IT services and expertise to the Legislature, Judiciary, and local governments on a voluntary basis. The Gartner Group confirms that, “...without some level of enterprise IT governance, governments operate agency technology ‘stovepipes’, with each department or agency implementing its own channels, Web pages, applications and supporting infrastructure – diverting resources away from agencies’ central missions.”³¹ Few states, if any, are as committed as Massachusetts to partnering with all branches and levels of government to establish a fully operational IT enterprise.

Still, the Commission recognizes that the Massachusetts Constitution, including its separation of powers provision, limits the extent to which any branch of government or agency may exert control over, or set IT policy for, another branch of government. Nevertheless, members believe that, consistent with the Constitution, considerable latitude exists for cooperation and coordination of IT services, practices, standards and policies affecting all branches and levels of

“In the government of this commonwealth, the legislative department shall never exercise the executive and judicial powers, or either of them: the executive shall never exercise the legislative and judicial powers, or either of them: the judicial shall never exercise the legislative and executive powers, or either of them: to the end it may be a government of laws and not of men.”

Source: Massachusetts Declaration of Rights, Article 30.

³¹ Bill Keller and Judith Carr, “Enterprisewide Governance: The North Carolina IRMC,” Gartner Note No. CS-14-5938, 19 Oct 2001: 1-2.

government within the Commonwealth. For example, there would appear to be no constitutional impediment to any branch participating voluntarily in the sharing of data processing facilities and services offered or managed by another branch, or to any branch or agency functioning in a strictly service capacity for another branch. The recommendations in this report concerning “enterprise-wide” IT are all subject to, and should not be implemented except in accordance with, these constitutional requirements. Commission members hope that, to the extent, if any, that the Constitution may prohibit centralization of authority over enterprise-wide IT as envisioned by these recommendations, all branches of government will recognize the benefits of adopting the same practices, standards, and policies as recommended in this report, and that they voluntarily will work with each other to realize the goals of a secure and integrated IT environment as envisioned by this report.

The evolution of technology has created two differentiating perspectives on the role of IT in state government operations: IT services as a utility, and IT applications necessary and specific to managing internal business operations. In the Commission’s opinion, it is the first category, the view of IT as a utility, which offers the greatest promise for cooperation and collaboration across branches and levels of government. It is also the area of greater, more immediate potential cost savings for the Commonwealth. Significant advantages accrue by implementing an enterprise approach to the second category of IT, also, although governance becomes a more challenging issue in a federated model that balances stakeholder needs across the enterprise. Also, the Massachusetts Constitution limits the extent to which any branch of government or agency may exert control over, or set IT policy for, another branch of government. However, an Office of the CIO that can establish an IT governance framework to successfully promulgate architecture and policies, share expertise in technology and program management, assist entities in developing common solutions, facilitate access to federal and state resources for local governments, and respond to customer feedback may convince stakeholders of the value of joining in a shared IT governance structure. An IT governance structure, established in partnership with all branches and levels of government, would put Massachusetts at the forefront of state efforts nationally to achieve an enterprise IT framework, and create a seamless service interface for Massachusetts citizens and businesses who require access to government services.

The Commission recognizes that the traditional description of the state CIO as simply a manager of IT services is no longer apt. To be effective, today’s government CIO must perform a political and policy role. The growing complexities of operating in an enterprise environment require political leadership and personal skills that can transition comfortably between the business and technology worlds in government. There seems to be a consensus building among experts about the changing nature of the CIO’s role. According to Gartner, the key attributes of an ideal CIO are:

- Understanding the business issues of the enterprise;

- Translating between the business needs and technology solutions; and
- Offering strong leadership in the areas of business *and* technology.³²

Government Technology magazine notes that governors are increasingly seeking “...CIOs who bring executive leadership, a future orientation and political acumen to the act of governing through technology,” and suggest that the CIO is a “catalyst and collaborator in chief.”³³

Ultimately, “...the success of the CIO depends less on talent than on the parameters of the position and the level of authority that is granted.”³⁴ States are reconsidering the most appropriate role for CIOs to perform, and experts disagree on whether or not that role should include both operations and policy. For example, Georgia, Virginia, and Washington have combined responsibility for both “thinking and doing” in their CIO positions, while California and Arizona restrict their CIOs to strategy and oversight functions only. The 2001 survey of states by the Center for Digital Government produced the following information about state CIOs:

- 54% have cabinet level authority;
- 74% have responsibility for infrastructure and operations;
- 68% have responsibility for project management; and
- 84% have policy-setting authority, with 72% of them working in conjunction with a board or commission.³⁵

The National Association of State CIOs (NASCIO) reports that 38% of state CIOs have enterprise IT budget approval authority, and 72% have some level of IT procurement approval across state agencies.³⁶

The IT Commission believes strongly that the Commonwealth CIO should be responsible for both IT operations and strategy, for the following reasons:

- Strengthens the implementation and enforcement of IT strategies and policies;
- Improves the development of pragmatic, implementable policies;
- Fosters continuous improvement through feedback on the practical application of IT policies;
- Identifies operational needs for additional policy and direction; and

³² John Kost, “Creating a Public -Sector CIO Job Description,” Gartner Note No. SPA-17-2805, 18 Sep 2002: 8.

³³ Paul W. Taylor, “The Essential CIO: The Case for a Catalyst and Collaborator in Chief,” Government Technology, Oct 2002: 26-27.

³⁴ John Kost, “Prediction: An Uncertain Fate for New CIOs,” Gartner Research Note No. COM-18-7938, 4 Dec 2002: 2.

³⁵ Taylor, 27.

³⁶ Taylor, 26.

- Encourages comprehensive legislative consideration and decision-making on IT strategy and operations.

Today, every state has a CIO position, and the trend among states has been that the CIO is a commissioner, a secretary, or a cabinet official.³⁷ “The turnover rate among state CIOs during the past four years has been high – more than 40 per cent a year.”³⁸ 2003 will be no exception as new governors force the departures of some CIOs. These departing CIOs are, “...vacating key positions that would otherwise set the long-term strategic focus of technology implementation and foster cooperation across the enterprise.”³⁹ Gartner believes that, “...the lack of continuity in the chief strategic technology leader may hamper the momentum and focus on critical issues such as effective governance, enterprise architecture and business process coordination.”⁴⁰ Of course, effective governance, enterprise architecture, and business process coordination are key to the success of enterprise IT management. The Commonwealth can insulate itself from the impact of turnover in the CIO position by developing and adhering to technology strategies, equipping organizations with the tools and governance frameworks needed to resolve critical issues over the long term, and creating incentives for greater intergovernmental cooperation in technology planning.⁴¹

According to the Center for Digital Government, the more of the following elements that are incorporated into a state CIO’s role, the stronger the state’s IT governance structure will be:

- Works with a state IT Board;
- Has policy setting authority;
- Has cabinet-level authority;
- Is responsible for operations; and
- Is responsible for enterprise IT project management.

Thirty percent of state CIO positions include all five characteristics, and an additional 30% have four of the five factors. A strong CIO position, as defined by these elements, seems to correlate with states’ top rankings nationally in various performance surveys.⁴² Increasingly, states are recognizing the importance of IT support functions, such as fiduciary responsibility, procurement approval, project management oversight, technical assistance, and training to achieving the business

³⁷ Taylor, 27.

³⁸ Kost, “Prediction: An Uncertain Fate for New CIOs,” 2.

³⁹ Rishi Sood, “State and Local Government: The Perfect Storm,” Gartner Dataquest Note No. ITSV-WW-DP-0439, 20 Dec 2002: 4.

⁴⁰ Sood, 5.

⁴¹ Sood, 6.

⁴² Taylor, 27.

goals of the enterprise, and are giving CIOs more direct authority in these areas. However, it is critical that the Commonwealth establish clear accountability among the Office of the CIO, central control agencies, and line agencies for the performance of these support functions. For functions that continue to reside at the agency level, the Office of the CIO can assist in developing effective management control practices.

RECOMMENDATIONS

The Commission, after considering the results of the “As Is” Assessment, examining best practices, consulting with practitioners, and subject to any constitutional constraints, recommends that the Commonwealth implement the following seven actions for strengthening IT governance in Massachusetts.

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- a. Elevate the role of the Office of CIO for the Commonwealth and expand its scope to better manage both IT policy and operations for the enterprise.*
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The Commission recommends that the Commonwealth establish a new Office of the CIO, which will be broader in scope than the current Information Technology Division (ITD). The role of the CIO should be elevated to ensure that the CIO has the visible authority and support necessary to be successful in managing the full scope of the position’s responsibilities because, as Gartner cautions, “public sector organizations in which the CIO does not fully participate in setting the policy/business agenda of the enterprise will waste technology resources because they are not aligned with the policy agenda of the enterprise.”⁴³ The Commission recognizes that the Office of the CIO will require additional resources, or time to reallocate among existing resources, to achieve the organizational readiness necessary for realizing the Commission’s vision for this new Office of the CIO, as discussed below and throughout the report’s recommendations.

Currently, the CIO is the Assistant Secretary for Information Technology within the Executive Office for Administration and Finance, and reports to the Secretary. The Commission recommends formalizing this title as “Commonwealth Chief Information Officer.” The Commission understands that it is the intent of the Romney Administration to maintain the CIO position subordinate to the Secretary of Administration and Finance, but with increased visibility among cabinet members. The Commission recommends monitoring this placement for success and effectiveness so that, in the long term, consideration may be given to elevating the position of Commonwealth CIO to a cabinet-level position. Elevating this position will ensure that IT governance will have a permanence and prominence in state government that will last beyond the tenure of the current Administration. The IT Governance

⁴³ Kost, “Prediction: An Uncertain Fate for New CIOs,” 2.

Institute advises that, "...the CIO should have the clout or influence to make these steps happen, wielding a position of authority in the organization and holding the power to say 'no'. While currently only one in five CIOs report to the CEO, that situation is gradually changing."⁴⁴

Information is an important asset for the Commonwealth, and a state resource. The CIO is as important to the management of government operations as any other asset manager (e.g., the chief financial officer). No business today can function without its information systems, for which IT investment, service demands, and risk levels are significant, and merit leadership attention. All government leaders require information to manage their businesses, and the information that is captured, stored, and provided by technology must be relevant and reliable, secure, and available when needed. The CIO is most valuable to these colleagues when he or she is a participant in discussions surrounding enterprise business decisions. If the CIO does not participate, he or she is relegated to the role of technologist. IT must be considered a partner with the business, instead of a service supplier, for an organization to achieve strategy integration.⁴⁵ Synergies develop among an organization's management team when business discussions occur in a collaborative manner, at a co-equal level.

The Commonwealth's Office of the Comptroller may provide an instructive model for elevating the role of the Commonwealth CIO while achieving an apolitical and cross-jurisdictional governance environment. In Massachusetts, the Comptroller is appointed by the Governor for a term concurrent with the Governor's term, and "...selected without regard to political affiliation and solely on the basis of integrity and demonstrated ability...." and may be removed for "...neglect of duty, misconduct, or conviction of a crime."⁴⁶ The Comptroller is supported by an Advisory Board consisting of, "...the attorney general, the treasurer, the commissioner of administration who shall be the chairman, the auditor, the chief administrative justice of the trial court, and two persons who have experience in accounting, management, or public finance who shall be appointed by the governor...." and the Board "...shall be responsible for reviewing any rules or regulations promulgated by the comptroller prior to their implementation."⁴⁷

To be effective, the Commonwealth CIO must develop a cooperative framework that balances the interests of individual agencies and the

⁴⁴ IT Governance Institute, "IT Governance Executive Summary."

⁴⁵ IT Governance Institute.

⁴⁶ Commonwealth of Massachusetts, General Laws (MGL), Chapter 7A, Section 1.

⁴⁷ MGL, Chapter 7A, Section 2.

enterprise, implements standards and centralization of specified services, and translates technology benefits into business benefits.⁴⁸

The Commission recommends that the Commonwealth CIO continue to be responsible for both IT policy and operations. The new Office of the CIO will perform a central service provider role, and should be strengthened and expanded to include functions that were excluded previously or had insufficient resources dedicated to them. *Government Technology* magazine states that the trend is to include Chief Security Officers and Chief Technology Officers within the Office of the CIO.⁴⁹

As a minimum, the Office of the CIO should have management responsibility for the following areas:

- Policy, including
 - Architecture/Standards
 - Strategic Planning
 - Policy Development, including
 - Security/Privacy
 - Risk Assessment and Risk Management
 - System Development
 - Business Continuity Planning
- Operations
 - IT Service Delivery
 - Portal Management (*Mass.Gov*)
 - Enterprise Applications
 - Help Desk
 - Security
 - Change Control
- Program Management
 - Procurement
 - Budgeting
 - Project Oversight
 - Portfolio Management
 - Quality Assurance and Quality Management
 - Performance Measurement

⁴⁸ Rishi Sood, “The Four Worlds of State and Local Government,” Gartner Note No. ITSV-WW-DP-0230, 6 Mar 2002: 5.

⁴⁹ Taylor, 27.

Within an enterprise, there is a natural tension over which assets or functions should be placed under the authority of the CIO, and which ones should be left under the control of the user agency. Gartner recommends that, "...Generally, assets and functions that are not unique to the mission-critical functions of the agency should be part of an enterprise strategy and 'owned' at the enterprise level." These enterprise assets and functions will almost invariably include:

- Enterprise architecture
- All IT resources (mainframes, servers, desktop devices, and peripherals)
- Networks
- Enterprise-wide applications
- Maintenance and help desk functions for common hardware and applications
- Standards for other IT resources, such as computing devices, operating systems, common applications, and software.⁵⁰

Several states are creating project management offices to assist agencies in managing major IT initiatives. The Georgia Technology Authority Acquisition Management Office oversees projects that exceed \$1 million, and Washington's Department of Information Services has a Management and Oversight of Strategic Technologies Division that includes senior technology management consultants to advise and assist agencies.

Most states are grappling with IT procurement reform so that technology may be acquired more rapidly and with the improved cost effectiveness that results from increased standardization and volume purchasing. Gartner cautions that, "Acquiring, building and managing IT solutions will be more difficult if processes related to procurement, funding and staffing are too inflexible."⁵¹ Procurement is a significant controlling force in government. The current trend is to assign responsibility for IT procurement to the state CIO. In Washington, although the statutory authority for acquiring and managing IT resources rests with agency heads, the Information Services Board establishes policies that guide agency procurements, according to project complexity and risk. Gartner advises that, "...the CIO should take ownership of master contracts that are available for use by agencies for various systems.... Agencies should continue to be responsible for applications, solutions, and data modeling that are unique to their mission-critical programs, as long as

⁵⁰ John Kost, "Government IT Responsibility: Enterprise vs. Agency," Gartner Research Note DF-17-4636 31 Jul 2002: 3.

⁵¹ John Kost, "Government's Hierarchy of Challenges," Gartner Research Note No. SPA-19-0248, 6 Jan 2003: 4.

this uniqueness is a function of the types of services rendered by the agency....”⁵²

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- b. *Establish an IT Advisory Board to support the Commonwealth CIO in setting enterprise policies and standards, and in providing oversight of major IT initiatives.*
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The Commonwealth should establish, through legislation, an IT Advisory Board to support the CIO in establishing enterprise policies and standards and in overseeing major IT investments. The Board’s membership should include a combination of permanent and rotating members, and representation from Commonwealth agencies, higher education, constitutional offices, the legislative and judicial branches, local governments, and the private sector. The organizational structure of the Board should include councils, committees, or working groups in key areas, such as strategy, technology, architecture, business, IT investment, and security. The legislation should include a sunset provision, to provide an opportunity to evaluate the effectiveness of the Board after a two-year period.

Boards are an essential element to effective enterprise IT strategy and oversight. Innovation, “... is increasingly dependent on effective governance boards that lay the foundation for enterprise communication, prioritize key initiatives, and support interagency development....Effective governance boards will consist of members that can deliver true decision-making authority and....tap into the expertise of private sector firms for help in understanding the complexities of strategic technology decisions.”⁵³ In addition, IT Boards provide an essential forum for government organizations to share data and systems.⁵⁴

The IT Governance Institute, aware that IT has traditionally been treated as an entity separate from the business, stresses the importance of responsibility for IT oversight among corporate boards of directors:

“...enterprises rely on IT for their competitive advantage and cannot afford to apply to IT anything less than the same level of commitment they devote to financial supervision and overall enterprise governance. Now is the time for boards of directors to provide necessary oversight and form dedicated IT committees....IT governance calls for sound decision making, clear process and leadership....”⁵⁵

⁵² John Kost, “Government IT Responsibility: Enterprise vs. Agency,” 3.

⁵³ Sood, “The Four Worlds of State and Local Government,” 5.

⁵⁴ Keller and Carr, 4.

⁵⁵ IT Governance Institute.

The Institute believes that the top issues for IT management have transitioned from technology to management-related issues that clearly map to the following IT governance responsibilities:

- Strategic Alignment
- Value Delivery
- IT Asset Management
- Risk Management
- Performance Measurement.⁵⁶

As noted among the “as is” observations in this report, Massachusetts does not have an enterprise direction that represents all stakeholder groups, or a mechanism for developing one. In addition, the Commonwealth needs executive-level leadership to achieve collaboration and leverage IT investments across the enterprise. An IT Advisory Board, with broad representation and strong participation from state government leadership, can be effective in broadening the vision, setting the collaborative tone, and committing organizations to an enterprise business strategy that can be advanced through alignment with an enabling IT strategy. To facilitate this communication, the legislative and judicial branches should designate IT leaders (i.e., CIO-equivalents) to represent the interests of those branches to the Commonwealth CIO and the IT Advisory Board.

IT Board membership, scope, authority, and structure vary significantly among states, as does the degree to which states involve the legislative and judicial branches, higher education, or local governments in IT oversight. The Gartner Group highlights North Carolina’s Information Resource Management Council (IRMC) as a model for a governing council:

“To enable e-government transformation, governments need to develop new governance models with the power and influence to set and enforce standards and policies across the enterprise. The North Carolina IRMC is a model for a governing council that has broad representation from all branches and levels of government in the state, a legislative mandate, and a highly qualified, independent staff. Other governments should seek to develop similar structures to lead and manage their IT efforts.”⁵⁷

North Carolina’s IRMC meets monthly, and the state CIO is a member of the Commission. Other members include:⁵⁸

⁵⁶ IT Governance Institute.

⁵⁷ Keller and Carr, 5.

⁵⁸ State of North Carolina, General Statutes 147-33.78.

- Four Council of State members (elected officials, appointed to the IRMC by the governor), one of whom is elected to chair the IRMC;
- Secretary of State;
- Secretary of the Department of Administration;
- State Budget Officer;
- Two members of the Governor's cabinet;
- Two citizens appointed by the Senate;
- Two citizens appointed by the House;
- Chair of the IT Management Advisory Council;
- Chair of the Criminal Justice Information Network Governing Board;
- State Comptroller;
- Director of the Administrative Office of the Courts (or designee);
- President of the University of North Carolina (or designee);
- President of the Community College System (or designee);
- Executive Director of the League of Municipalities (or designee);
- Executive Director of the NC Association of County Commissioners (or designee);
- State CIO;
- Executive Director of the Rural Internet Access Authority (advisory member only).

The IRMC has three committees (Technical Architecture and Project Certification, e-Government, and Information Privacy and Protection), and is assisted by two other councils: the legislatively mandated IT Management Advisory Council (composed of senior agency program/business managers), and the CIO Council (an advisory council of agency CIOs). These two councils provide both a business and technology perspective from the agencies.

The IRMC has been highly successful in approving IT plans and statewide technology initiatives, and in establishing oversight processes, including architecture governance, project management, IT procurement, and third-party quality assurance. The IRMC reviews and certifies IT projects that exceed \$500,000, have statewide impact, or are specifically designated by the IRMC. The Commission receives support from NC's Office of Information Technology Services, but also has a small, independent staff to ensure that the IRMC is not overly influenced by the central IT organization.

The following paragraphs highlight several other states' approaches to establishing IT Boards. The Commission is presenting these models as representative of leading practices among state governments, which the Commonwealth may use as input into developing the most appropriate IT governance structure for Massachusetts:

- *Virginia's Council on Technology Services (COTS)* is an advisory board that has 23 members and is chaired by the CIO (i.e., Secretary of Technology). The Council includes representatives from each Secretariat, five institutions of higher education, three local governments, and the legislative and judicial branches. The Council's working groups include subject matter experts as well as Board members, and their areas of focus have varied over time as the Commonwealth's needs have changed. Currently, one working group is dedicated to change management support. In addition to COTS, the CIO receives private sector input through a CIO Advisory Board, composed of 12 executives from Virginia's major employers. The Virginia Research and Technology Advisory Commission advises the Governor on research and technology strategies to enhance the state's competitiveness.⁵⁹
- *Washington's Information Services Board (ISB)* has IT acquisition, policy development, planning, and oversight authority for executive branch agencies, and is encouraged to seek input from the Legislature, Judiciary, and local governments. The ISB has 15 members, including the CIO and representatives from the Legislature, the judicial branch, higher education, public instruction, constitutional offices, and the private sector. The Board is staffed by the Department of Information Services' Management and Oversight of Strategic Technologies Division. In addition to the ISB, a Customer Advisory Board advises the CIO on service-related issues, and an Enterprise Management Group provides executive-level agency leadership for strategic digital government initiatives.⁶⁰
- *Arizona's IT Authorization Committee (ITAC)* provides advice and counsel on major technology issues, and has jurisdiction to approve or reject IT projects with development costs that exceed \$1 million, for all three branches of government. ITAC's nine voting members include two agency directors, the Administrator of the Courts, four private sector individuals who are knowledgeable in IT, and two additional members from the private sector or state agencies. In addition, there are four advisory representatives from the Legislature (2), local government, and the federal government. The state CIO chairs the ITAC, but is an advisor to the Committee. The Committee receives support from the staff of the

⁵⁹ <http://www.technology.state.va.us/Agencies/commissions.cfm>

⁶⁰ <http://www.wa.gov/dis/role/authorizing.htm>

Government Information Technology Agency. In addition to the ITAC, the CIO Council is a technical advisory committee that provides advice and support to the CIO on statewide information technology issues, and on developing statewide policies, standards, and procedures. The Arizona Portal Advisory Committee advises the state CIO on the development, implementation, operation, and growth of the state portal.⁶¹

- In Utah, the CIO is responsible for vision, strategy, direction, guidelines, policies, planning, coordination, and oversight of information technology for executive branch agencies. The CIO reports to the Governor, is a member of the Governor's cabinet, and chairs the state's Information and Technology Policy and Strategy Committee.⁶² Recently, Utah's governor instituted a highly collaborative approach to funding IT projects by establishing an E-Government Council, chaired by the Governor and composed of 17 executive and deputy directors. This council meets monthly, "...to evaluate and set priorities for large IT projects that cross agency boundaries and compete for resources." Members of the E-Government Council are asked to agree on what to fund and how, to build the project(s) together, and sometimes to defer an agency priority for the purpose of the enterprise. The Governor believes that, "The only way those judgments can be made are at the executive-level." Ultimately, council approval results in a project charter that defines agencies' commitments of financing, personnel, and space, and the assignment of a project director. The charter also outlines which business processes the agencies will need to change in order to be a part of the project.⁶³
- *The Georgia Technology Authority (GTA)* is guided by a 12-member Board of Directors. Each member must be employed in the private sector and have high-level experience in managing large IT enterprises (and may not have any conflicts of interest with state IT procurements). The Governor appoints seven members, and the Lieutenant Governor and Speaker of the House each appoint two members. In addition, the Board includes one non-voting member appointed by the Judiciary. GTA's Board of Directors establishes enterprise policies that apply to all executive branch agencies, except those under the direction of constitutional officers. The Board has a voluntary relationship with the legislative and judicial branches, and local governments: these governmental entities can opt to adopt, modify, or ignore GTA policies. The Board is authorized to have a standing committee of agency representatives. Georgia also has an IT Policy Council, composed of

⁶¹ http://gita.state.az.us/councils_committees

⁶² <http://cio.utah.gov>

⁶³ Ellen Perlman, "The Anti-Silo Solution," *Governing*, Jan. 2003.

representatives from state agencies, local government, and the private sector, to advise on strategic planning and direction.⁶⁴

Gartner recommends that the executive branch, “Include the Legislature in the process and recommend legislation that gives it [the Legislature] a significant role in appointing the members of the governing council. Ensure that independently elected officials have a significant role on the governing council and that they understand the benefits of developing a common infrastructure.”⁶⁵ A number of states have seen multi-jurisdictional collaboration between legislative technology oversight committees and the Office of CIO regarding governance and infrastructure issues. In North Carolina, legislative leadership in both chambers worked closely with the executive branch to draft Senate Bill 222 (2000 Session), a major bill that strengthened the governance role of the CIO and the NC IRMC.

California’s CIO, Clark Kelso, is operating under Executive Order, but recognizes the need “...to re-establish a legislatively supported governance structure....” in order to develop, “...a coherent statewide vision for how IT could be used in support of government operations. It’s a vision that says that the state needs to manage, deploy, and develop its IT resources to support responsive and cost effective state operations, and to establish timely and convenient delivery of state services, benefits, and information.” Mr. Kelso speaks about relying much more now on collaboration and communication than on attempted command and control to reach out across branches and levels of government.⁶⁶

As discussed in the introduction to this section, turnover rate is high among state CIOs. However, the establishment of an IT Advisory Board, with broad representation from among enterprise stakeholders, will create an effective governance structure that will insulate the Commonwealth from the risk of disruptive changes in individual IT leadership by institutionalizing enterprise policies, standards, architecture, and a management control framework that will transcend a change in leadership in the Commonwealth CIO position.

c. Establish formal reporting relationships between the Office of the CIO and agency CIOs.

The Commission believes that the Commonwealth will benefit from a more specific reporting relationship between the Commonwealth CIO and the CIOs within executive branch agencies. Collectively, the Commonwealth CIO and

⁶⁴ http://gta.georgia.gov/02/channel/0,2188,1070969_1162980,00.html

⁶⁵ Keller and Carr, 4.

⁶⁶ Michelle Gamble -Risley, “Clark Kelso Discusses California IT,” Center for Digital Government, Jan. 2003, <http://www.centerdigitalgov.com/government/story.phtml?docid=2003.01.22-38594>

agency CIOs provide the technology leadership for the Commonwealth, and the Commonwealth CIO must be able to focus and coordinate the management of agencies' IT resources to advance the strategic objectives of the enterprise. This focus and coordination includes identifying resource sharing and investment opportunities, driving development of common IT solutions and business processes, and enforcing agency compliance with enterprise strategy, planning, architecture standards, and management processes. Other states have changed the CIO reporting structure to provide more focus on IT. Virginia completed its strategic IT plan recently, and is requesting legislative approval to consolidate all 91 executive branch agencies' IT resources (staff and budget) under the management of a new, consolidated cabinet-level agency, named the Virginia Information Technologies Agency (VITA). In this new organization, the Commonwealth's 2,200 IT staff will report directly to VITA management but will remain on-site at large and mid-size agencies. Customer feedback and satisfaction will be key performance indicators for VITA employees.

Based on lessons learned in other states, the Commission recognizes that care must be taken in establishing a new reporting structure. It is premature for the Commission to define the exact nature of these reporting relationships, in advance of Governor Romney's announcement of his reorganization plan for state government. This reorganization plan is prerequisite to determining the most appropriate reporting structure between the Commonwealth CIO and agency CIOs. However, the Commission recommends that agency CIOs continue to represent agencies' end-user business perspective to the enterprise IT community. In addition to these IT management functions, Gartner suggests that these agency CIOs carry the responsibility for creating awareness of the value of technology, educating key political and business unit officials on the possibilities of innovation, and participating in the development of effective governing and advisory committees.⁶⁷ The Commission recommends that agency CIOs continue to work on-site at the business agencies, with the goal of advising agency leaders on the most effective ways for technology to facilitate their businesses and advance their strategic objectives. Or, as California's CIO puts it, advising on "...creative, practical options that agency directors can consider, as they respond to budget changes affecting their programs...."⁶⁸ In these ways, agency CIOs will remain a critical link between the IT community and the agencies' business users.

Information-sharing among the agency CIOs has begun already, and must continue. Monthly CIO Council meetings, which are chaired by the

⁶⁷ Sood, "The Four Worlds of State and Local Government," 9.

⁶⁸ Gamble-Risley.

Commonwealth CIO and attended by agency CIOs, provide an excellent forum for the IT community to improve communications and information-sharing among agencies, develop a shared understanding of technology strategies, and foster an attitude of ownership and accountability among agency CIOs for enterprise IT success.

d. Leverage “community of interest” concepts to deliver government services more effectively and efficiently.

The Commission recommends that the Commonwealth develop communities of interest to facilitate integrated planning and development of common business processes across governmental silos, processes that can be enabled through technology. These communities of interest may be effective in overcoming the structural barriers to decision making and service delivery that exist within the larger enterprise in the form of agency boundaries, legislative committee structures, funding streams, geographical borders, etc. The Romney Administration has provided examples of potential communities of interest through the creation of two new cabinet-level positions: the Chief of Commonwealth Development, and the Chief of Labor and Commerce. Alternatively, a community of interest might develop around education needs across agencies (e.g., preschool, early intervention, K-12, higher education, residential schools for children with disabilities, justice system education programs, etc.)

Communities of interest may develop specialized portals that expand and simplify access to resources for community members. Similarly, these communities may emerge as centers of excellence to address needs outside the immediate community. For example, rural communities may look to an education community of interest to establish or enhance long distance learning opportunities in their regions. The ultimate objective of these communities of interest is to use technology to achieve cross-boundary, seamless service delivery to citizens and businesses in Massachusetts. Ultimately, these communities of interest may evolve to develop integrated systems that span jurisdictional boundaries.

Many communities of interest are likely to be ad hoc or topical in nature, created to address pressing, but not permanent, issues. However, some mature communities of interest may require a dedicated manager (i.e., a Chief Liaison Officer) who would report to the Commonwealth CIO or CTO to ensure that cross-agency efforts are consistent with the enterprise policies, standards, and architecture promulgated by the IT Advisory Board. In some communities of interest (e.g., Education, Health and Human Services, Public Safety), these liaison positions may coincide with Secretariat CIOs. However, it is

imperative that the work of these communities of interest crosses the traditional boundaries of the Secretariat in order to be effective.

It is important that overall efficiencies, which are possible from expanded scope and greatly expanded scale efficiency, not be sacrificed due to the lack of authorized governance strategies supporting them.

e. Transform ITD to be a customer-centric, central IT provider.

The Commission recommends that the Office of the CIO foster an organizational culture that is customer-centric. This central IT organization is a service provider whose mission is to deliver quality, reliable, secure, cost competitive IT services that promote the achievement of agencies' business objectives and improve business results. This mission requires a more external focus on the customer than has been the traditional orientation of many IT organizations, who have been more likely to focus internally on creating cost efficiencies than externally on delivering increased business value to end users. A customer-driven IT service delivery strategy aligns with agencies' business goals, and defines IT services and service levels in terms of what customers in agencies want to buy and use (e.g., "24-hour coverage, seven days a week" versus "high speed network"). The Commonwealth's central IT organization should be evaluated on performance and customer satisfaction metrics, as documented in service level agreements and memoranda of understanding. Policies, standards, and procedures affecting IT assets and services should be developed through a participative governance process, such as an IT Advisory Board. The central IT provider should invest in relationship management with agencies to maintain open communications with users and to manage their expectations.

To be effective, the Office of the CIO, as a central IT service provider, must have credibility with the agencies. The Commission recognizes that some agency stakeholders lack confidence in the ability of today's central IT organization to deliver enterprise IT services effectively and efficiently:

"How an enterprise views its IS organization is critical to its ability to leverage IT as key means of achieving strategic business goals. A credible IS organization is seen by business units and senior executives as believable, reliable, and able to provide wise IT counsel and tools to help propel business growth."⁶⁹

⁶⁹ C. Young, B. Rosser, and D. Morello, "How to Climb the IS Credibility Curve, Decision Framework," Gartner Research Note (October 8, 2002): 1.

Gartner recommends that IT organizations build and enhance their credibility by addressing five drivers that can improve enterprise perceptions:

- a) Alignment and Vision
- b) Customer Satisfaction
- c) Pricing and Service Levels
- d) People, Sourcing, and Relationships
- e) Business Behaviors⁷⁰

In IT organizations that command the greatest degree of customer respect and satisfaction, enterprise business leaders actively seek the advice, counsel, and innovation of the central IT organization. These IT organizations have learned to establish relationship managers with users, and involve stakeholders in evaluating and ranking project priorities. They have identified core competencies and are managing them across the enterprise, and have defined effective processes for planning, IT architecture, project management, funding, sourcing, and competency development. They are measuring business value.⁷¹ When poor perceptions of credibility define an IT organization, IT users and other stakeholders (such as enterprise executives) question whether IT investments are actually delivering promised business value.⁷²

f. Enhance and refine fiduciary responsibility for IT funding and management within the Office of the CIO.

The Commission recommends that the Office of the CIO have increased fiduciary responsibility for overseeing IT budgets and expenditures. The CIO should have review and comment opportunity on agencies' IT budgets prior to submission to the Legislature for appropriation, and on supplementary and deficiency appropriation requests as well as planned IT expenditures from other funding sources. Once budgets are approved, the CIO should have oversight and approval authority for agencies' execution of these budgets, to ensure agency compliance with enterprise architecture and standards, to assess opportunities for development of shared services, and to evaluate agencies' performance against established cost and schedule baselines.

Today, the Commonwealth CIO has the authority to approve, monitor, and halt executive branch agencies' IT projects that exceed \$200,000. To date, the Commonwealth's CIOs have never exercised this enforcement authority by

⁷⁰ Young, Rosser, and Morello, 1.

⁷¹ Young, Rosser, and Morello, 8-9.

⁷² Susan S. Dallas and Barbara Gomolski, "IS Credibility: The Path to Making the Most of IT, Article Top View," Gartner Group, 10 Oct 2002: 1.

halting unsuccessful projects. In addition, ITD is prohibited under the separation of powers provision of the Commonwealth's Constitution, from reviewing, approving or halting, as a matter of right, IT projects funded by bond funds set aside by the Legislature for the Legislature or Judiciary. For this reason, ITD has been reluctant to attempt to assert authority over IT projects funded by bond funds set aside by the Legislature for itself or the Judiciary.

Many state legislatures have granted CIOs financial oversight and approval authority.

- In Georgia, the Georgia Technology Authority (GTA) reviews agency IT budgets and approves all IT system development, enhancement, or modification prior to initiation. The GTA conducts procurements for agency projects that exceed \$100,000, and its Acquisition Management Office monitors all projects whose projected costs exceed \$1 million.
- In Arizona, the project threshold for CIO approval is \$25,000.
- Recently, Virginia granted the Secretary of Technology approval authority for IT projects that exceed \$1 million or have statewide significance. Although Virginia's CIO is pleased with this new authority, he is much more interested in becoming involved earlier in the process, in helping the business in, "...the development of the business strategy to change the way a business operates." He believes that, "...technology is a support and help in business processes and business process changes. It is not necessarily the end in itself..."⁷³

In considering this recommendation, the Commission concluded that, whatever approval threshold is chosen, the key is to implement a pragmatic oversight approach that adds value to the enterprise, not simply one that creates another bureaucratic approval process. Former West Virginia CIO, Keith Comstock, spoke to the IT Commission about his state's success in managing by exception, based on agencies' deviations from planned performance. Washington manages its IT oversight through a combination of delegated authority to agencies, and risk and severity matrices for IT project oversight.

In some states, financial systems are not designed to capture project-level costs for meaningful reporting. In Georgia, the Georgia Technology Authority, with the Budget Director and Auditor, is charged with developing a

⁷³ George Newstrom, summary of telecon, Center for Digital Government, Dec. 2002: <http://www.centerdigitalgov.com/government/story.phtml?docid=2002.12.30-36881>.

system of budgeting and accounting for expenditures for technology resources that integrates seamlessly with the technology portfolio management system.⁷⁴

Many states involve their IT Boards in the oversight of the CIO's fiduciary responsibility.

- Utah's E-Government Council prioritizes project proposals for implementation, and charters approved projects.
- Georgia has a steering committee to advise its CIO about expenditures from the Technology Empowerment Fund.
- North Carolina's Information Resource Management Commission certifies all IT projects within the executive branch that exceed \$500,000 in cumulative expenditures, have major or statewide strategic significance, or are designated by the Commission as requiring certification.
- Virginia's Secretary of Technology works in concert with a Technology Investment Board, which reviews, prioritizes, and authorizes all enterprise IT investments over \$1 million, and apportions costs for enterprise IT projects.
- In Arizona, the IT Authorization Committee has planning and oversight responsibility for projects that exceed \$1 million, in all three branches of government.

The Commission also recommends strengthening oversight of IT Bond Fund projects by the Office of the CIO. The CIO should institute a more collaborative approach to IT investments by involving the IT Advisory Board in prioritization and decision-making, and in IT project reporting and oversight. As discussed in the "As Is" Assessment, the IT Bond allocation process could be improved by increased collaboration between and among ITD and agencies during the development of investment briefs, establishing criteria for what types of investments are funded appropriately as capital projects, restricting the use of bond funds for maintenance purposes, assisting agencies in establishing the business case for IT investments based on operating budget impact and total cost of ownership, developing project management and performance metrics, and instituting a process for more consistent project oversight following project initiation. As discussed later in this report, the Commonwealth's development of enterprise business and IT strategies would be highly beneficial in guiding investment decisions made with IT Bond funds.

⁷⁴ Georgia Code 50-25-7.12, <http://www.ganet.org/cgi-bin/pub/ocode/ocgsearch?number=50-25-7.12>

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- g. *Adopt a “Total Cost of Ownership” approach and cost/benefit analysis for the assessment, management, monitoring, and funding of major IT initiatives and processes across the enterprise.*
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The Commonwealth should adopt a total cost of ownership approach and cost/benefit analysis for selecting projects for IT investment, and for managing and monitoring these investments throughout their life cycles. A TCO approach is beneficial to an organization because it requires a more comprehensive, upfront planning process, which improves the organization’s decision making. A cost/benefit analysis ensures that decision makers consider opportunities to realize increased revenues and other benefits from an IT investment, and do not focus solely on the cost of the investment. TCO and cost/benefit calculations should include fully burdened costs and, depending on the timing of decisions being made (e.g., initial development versus retirement of more mature systems), may include procurement, operations, maintenance, security, and/or disposal costs, as well as offsetting revenue generation and other benefits, some of which may be qualitative in nature. For example, the TCO planning horizon for an initial application development decision may be based on total development/deployment costs plus the first two years of maintenance, where the decision to retire an existing system would focus more appropriately on ongoing operational and maintenance costs. Of course, employee cost assumptions should include all of the Commonwealth’s costs associated with these employees, including salaries, benefits, management structure, administration, and facilities.

C. IT STRATEGY

As was stated in the “As Is” Assessment, the Commonwealth should have an overall enterprise strategy for achieving the collective business objectives of its members. An enterprise strategy should foster rationalization of business processes to improve government services. Building off that enterprise strategy, the IT strategy will help executive department agencies, constitutional offices, the Legislature and the judicial branch focus their energies and resources to bring value and cost-effective operations throughout government. The IT strategy establishes the vision, tactical plans, and daily activities to deliver high quality, cost-effective management of IT services.

The IT strategy for the Commonwealth should clearly articulate the philosophy and project the direction of enterprise IT into the future. It must consider the enterprise’s environment – the challenges, forces and changes that are ahead – and what strategic direction to pursue regarding IT. This strategy should be the result of a collaborative effort between the Commonwealth’s central and agency IT organizations and government business management leaders. An enterprise IT strategy provides the framework for sustainable growth and responsible development. From a citizen-centric perspective, it becomes impossible to promote a “single face” for all government services without an enterprise IT strategy that enables the sharing of information as freely as possible throughout government in a standardized manner.

With the current budget crisis facing state governments, fewer funds are generally available and new accountability standards demand a clear economic payoff from any IT investment. Financial uncertainty is coupled with a rapidly changing technology environment. Gartner recommends “...that enterprises respect this rapidly changing business climate by engaging in IT planning that both benefits from the merits of traditional strategic planning but also adapts it in new ways to accommodate the new more uncertain business and technical environment.”⁷⁵

For the Commonwealth of Massachusetts to develop an effective IT strategy, it will require the cooperation and collaboration of business and IT management to develop a common understanding of enterprise business goals and the allocation of IT resources to support those goals. According to Gartner, there are three perspectives that need to be considered in developing an IT strategy:⁷⁶

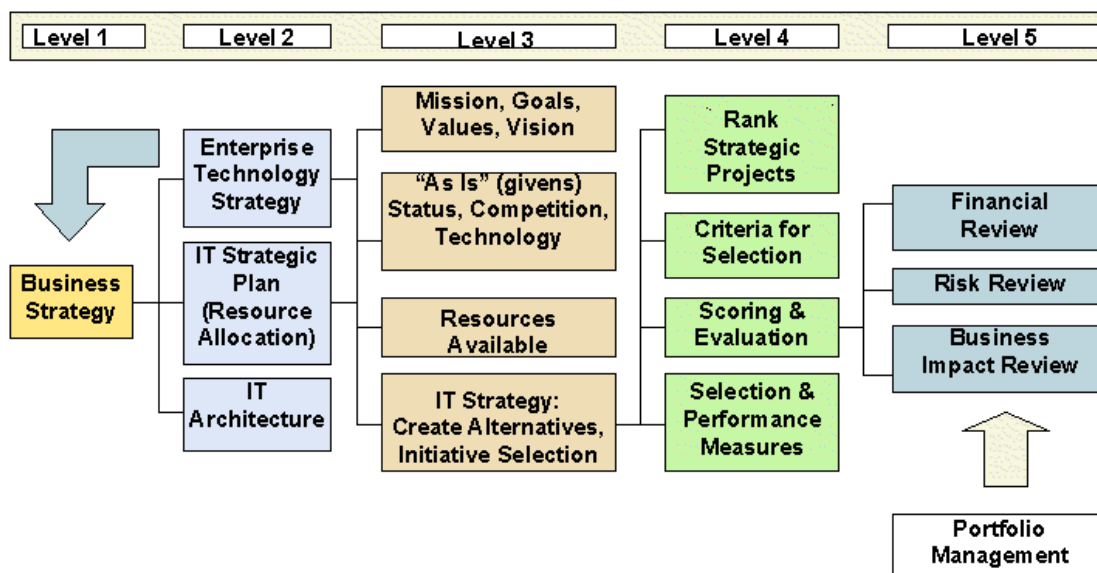
- *Establish the agreed-upon role for IT to play — especially with regard to how aggressively the enterprise wants to benefit from IT.* This may also set the technology framework for the future, including the infrastructure, and the agreed upon business and IT management’s philosophy and directions.

⁷⁵ Bill Rosser and Dean Lombardo, IT Planning: A New Perspective, Gartner No. R-14-5700, 26 Sep 2001: 3.

⁷⁶ Rosser and Lombardo, 4.

- *Allocation of the available IT resources.* Allocating resources, especially funding, to enterprise projects that will have the very best results for the Commonwealth as a whole. Developing a prioritization process that must include an enterprise evaluation based upon defined criteria and weighting of relevant factors.⁷⁷
- *Selection of technology guidelines to be used as projects proceed towards funding and implementation.* This perspective must incorporate standards in both components and in design style – to achieve benefits of interoperability and lower costs through design consistency.

IT Strategic Planning Process Framework



Source: Gartner, *IT Planning: A New Perspective*, September 26, 2001.

⁷⁷ Rosser and Lombardo, 4.

RECOMMENDATIONS

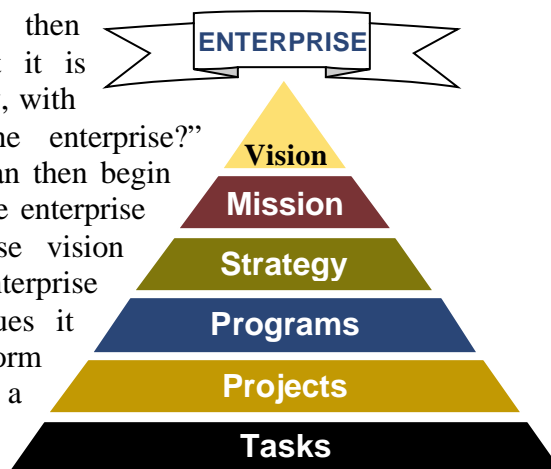
The Commission, after considering the results of the “As Is” Assessment, examining best practices, and consulting with practitioners, recommends that the Commonwealth implement the following seven actions for improving IT strategy in Massachusetts.

a. Define the enterprise, articulate an enterprise vision, and create an enterprise strategic business plan.

At the very first meeting of the IT Commission, the question arose as to what exactly constituted the Massachusetts “enterprise”, and in the context of an entity as complex as government, this is indeed not nearly as simple a question as it sounds. While most private sector companies, non-profit organizations, and other institutions can strategize around one or a few segments of the population – for example, “the consumer” or “the worker” – definition of the government enterprise and of its vision and strategic plan is something of a more complex undertaking.

The Commonwealth must begin by deciding what will constitute the scope of the enterprise and how will that scope be allowed to grow. The enterprise is an evolving concept – one that must begin more simply than what it is eventually envisioned to become. To define the enterprise initially to be inclusive of every agency in each branch of all levels of government is not practical, even though collaborative and integrated government may be the ultimate aspiration of what the enterprise will embody. A commonly used analogy is that of world hunger: an impossible problem against which to take action unless its scope is initially defined more narrowly than the whole world (i.e., maybe a single community, then a group of communities, followed by a state, etc.)

Once defined, the enterprise then requires a vision around what it is supposed to be. Put another way, with the question of “Who is the enterprise?” answered, the Commonwealth can then begin to ask (and answer) “What is the enterprise about?”. A clear and concise vision statement describing what the enterprise seeks to embody and the values it ascribes to itself creates a uniform sense of purpose from which a sound and meaningful strategy can be built.



In defining the overall enterprise, the Commonwealth should incorporate economic development and homeland security into their comprehensive definition. Defining the boundaries of the networked enterprise further enables universal access by citizens, end-users, and partners to all governmental services of agencies, authorities, and municipalities of the Commonwealth. By broadening the definition, enterprise IT improvements and modernization will enable education, enhance public safety, and foster numerous other groups to pursue a variety of communities of interests. Each such interest community should become an authorized user group of, and contributor/partner to, the integrated network resources of the enterprise.⁷⁸

With the enterprise defined and its vision articulated, the Commonwealth is then well positioned to articulate the enterprise's strategic plan. The strategic plan clearly sets out the goals for the enterprise, providing insight and direction into how exactly the vision is to be achieved. It sets the top-level priorities from which agencies' missions, business objectives, business processes, and overall strategic plans can then be built. This strategic direction is absolutely critical to ensuring that other planning processes at deeper levels of the enterprise – for example, the agencies or the Office of the CIO – all tie back to a master plan that says how the Commonwealth prioritizes the delivery of services to its citizens, businesses, and/or employees. Without this overarching plan, strategic planning at the department, division, or agency level is likely to be compartmentalized, misaligned with the needs of the public, confined to the boundaries of a silo (or silos) of the organization.

In the report Six Building Blocks for Creating Real IT Strategies (Gartner: 11 Dec 2002), authors Robert Mack and Ned Frey discuss the strengths and weaknesses of IT strategies and prescribe a nine-step process for creating effective IT strategies. The first step they cite in their methodology is, in fact, “Understand the Business Strategy”. This starting point is clearly a starting point that the Commonwealth would be wise to adopt in endeavoring to produce an IT strategy that is both meaningful and effective.

From the “As Is” Assessment, it is clear that Massachusetts already has the makings of an enterprise vision, with terms such as *single face of government*, *collaborative approach*, and *citizen-centric government* already resonating as key themes in numerous areas throughout the Commonwealth's government. To solidify this vision and build consensus around a strategic plan, involvement must come from the highest levels of agencies with key customer-facing functions as well as agencies performing support functions. Leadership commitment and participation is an undeniably critical success factor in setting the enterprise

⁷⁸ Massachusetts Technology Collaborative, Final Recommendations to the IT Commission, 14 Feb 2002.

direction, as is the participation of as many of the Commonwealth's agencies and departments as is possible and manageable.

At this moment, however, the practical reality is that there is no enterprise-wide business plan and the CIO cannot continue to wait for that plan to be developed. Therefore, the Commission recommends that the CIO commence immediately on the drafting of an IT Strategic plan based upon available documentation regarding Administration priorities, in consultation with the other branches, in order to define the business priorities of the enterprise. That plan, once readied for review, will be provided to the other branches for comment and approval. The objective of that comment and approval process is to ensure that the plan as drafted will support ongoing and known new operations as well as provide the other branches the opportunity to provide insight into planned operational changes in the absence of the comprehensive business strategy. Those comments and inputs will form the basis for creation of an overall enterprise business strategy.

b. Establish a formal process for creating and updating the enterprise IT strategic plan for managing and expanding information technology in the Commonwealth, in alignment with the business strategy.

Because information technology is evolving and changing so rapidly, the Commonwealth needs a process by which it regularly revisits its IT strategic plan. With the effects of Moore's Law constantly reshaping IT, a static IT strategy will quickly lose meaning and impact if it is not regularly assessed against the following criteria:

- Does the IT strategy still align with the overall strategic plan for the enterprise?
- Is the IT strategy still appropriate to the context of the present-day information technology industry?
- Does the IT strategy sufficiently embrace emerging technologies?
- Is the IT strategy effectively protecting the Commonwealth against volatilities in the IT industry?
- Does the IT strategy align with performance standards of those business functions that are enabled by IT?

In the public sector, the City of Minneapolis, MN is often cited as a best practice in this area. In February, 2000, *Governing* magazine gave Minneapolis a grade of A- in information technology, saying "strategic IT planning is about as good here as anywhere in the country." Minneapolis revisits its IT strategic plan every two years, evaluating it against a series of meaningful questions such as the ones that appear above. As a result, Minneapolis has enjoyed tremendous success in establishing and deploying a

consistent set of IT standards, in operating a highly effective data warehouse, and in proactively identifying areas for further improvement.

c. Develop a comprehensive IT infrastructure plan for the enterprise.

The “As Is” Assessment identified that the infrastructure in the Commonwealth is fragmented and duplicative. This fragmentation and duplication has driven the cost of support of the infrastructure higher than it could otherwise be, and has increased the barriers to common operations of Commonwealth offices. In order to attack this fragmentation, there should be a comprehensive enterprise IT infrastructure plan for the Commonwealth. The Office of the CIO should be responsible for this plan.

There is a larger discussion of the infrastructure later in this chapter (see Part E). A few areas that are most germane to the development of a comprehensive strategy are highlighted here.

In the Applications arena, the Commonwealth has already identified a few enterprise applications that are centrally managed and provided, including MMARS, HR/CMS, MassMail and the Mass.Gov Portal and its shared services. However, business applications that may have cross-agency use, or that may meet the requirements of multiple agencies, are not being identified.

The “As Is” Assessment, based on a survey of a few key data centers, indicates that the Commonwealth’s data centers are generally adequate, but that there are inconsistencies in operations practices, space utilization, and capacity planning. In fact, the report highlighted the single word “inconsistent” as the major characterization of the centers

The Commonwealth networks are also fragmented and disjointed. There is no unified planning for either voice or data networks, either operationally or strategically. There are as many as 13 to 20 independent networks currently in place in the Commonwealth. These networks do not share architecture, technology, security or monitoring philosophy, and are only interacting with one another with significant investment of resources in making that happen. Finally, the cost of these disjointed networks is significantly higher than it needs to be.

All of these disjointed situations are the result of a lack of a central enterprise infrastructure plan. Each individual agency has proceeded without central guidance, resulting in the balkanization of the infrastructure. The Commonwealth should immediately charter the Office of the CIO to create an enterprise-wide infrastructure plan and, once agreed by all participants, that plan should guide all future infrastructure decisions.

d. Align the Commonwealth's legal framework with the enterprise strategy and IT plan, within Constitutional guidelines.

The separation of powers within the government has created a natural barrier to sharing of IT facilities, resources, and infrastructure. The requirement that the three branches of government be independent meant that each developed technology to support itself, resulting in duplication and incompatibility. Even within branches, until recently, the exchange of data between agencies was hampered by the incompatibility of the systems, or by legal and regulatory requirements that governed how data is to be handled.

In the wake of September 11th, however, the barriers to sharing data between government branches and agencies are being challenged. While data sharing gives rise to significant public policy issues and concerns, the technology does exist to support common data sources, and the need for increased data sharing has created a new demand for interoperability. At the same time, the current fiscal crisis has also demanded that the agencies and branches seek new ways to provide better services, faster than before, and for lower costs.

In order to take advantage of the abilities that new technology can provide, and to find those security-enhancing, but cost-saving interoperabilities, the legal and regulatory barriers to data sharing and infrastructure sharing must be addressed within a sound, public policy context.

As a part of the strategic plan, the Office of the CIO should identify those barriers to efficiency and effectiveness resulting from a legal framework that may have been appropriate in the past, but which have created major inhibitors to progress today. The Legislature should then address the barriers with changes to the statutes of the Commonwealth.

Clearly, where separation of powers would prohibit it, collaboration and cooperation between branches may remain impossible. However, it is likely that over time practices and processes have been built into both the canon of law and regulations that are neither constitutionally required nor good business. It is these barriers that should be removed.

e. Align monies from the IT Bond Fund with objectives set out in the enterprise strategic plan.

As discussed in IT Strategy recommendation "a" (see page 115), the Commonwealth must establish an enterprise strategic plan to establish unilateral objectives and set a particular direction for the delivery of government services in Massachusetts. Faced with a tightening economy that is shrinking revenue and forcing reduced budgets, governments at all levels must learn to do more with less. The Commonwealth must use collaborative

technologies to work together and allow agencies and departments to share appropriate information across governmental boundaries. The Commonwealth must align the disbursements from such funding mechanisms as the IT Bond Funds to create incentive and accountability for agencies to execute and leverage resources according to the enterprise strategy.

The IT Bond Fund application and allocation process already involves the articulation of a business case by an agency for a particular investment. While this is a good start, the review and selection process for project funding needs to better draw its direction from a higher-level enterprise strategy. While the CIO should continue to provide directives and input into the disbursement of how and to whom IT Bond Fund monies will be disbursed, the CIO should be clearly able to derive a disbursement protocol from a set of higher level strategic objectives. Furthermore, the guidelines and procedures for allocating IT Bond Fund grants should be revisited as often as the enterprise and IT strategies are revisited (see IT Strategy recommendation “b”, page 117) to ensure that funding mechanisms are kept in line with the Commonwealth’s strategic direction and objectives as they evolve.

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- f. Establish and monitor enterprise service and performance metrics, using a balanced scorecard approach, to measure performance in order to drive accountability and ownership for enterprise success.*
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Accountability only comes with measurement; one can only “expect” what one is able and willing to “inspect.” Therefore, in seeking to create and operationalize collaborative, enterprise behaviors, the Commonwealth must establish a fresh set of outcome-based performance metrics to get agencies out of the silo mentality and into a quality of service mentality.

The importance of establishing accountability was strongly urged by Wendy Rayner, former CIO of the State of New Jersey, who indicated that business metrics were required to measure agencies in that state, and recommended that the IT Commission demand both service delivery metrics from agencies as well as IT performance metrics from ITD.

In measuring agency performance, metrics must be customer-focused and be set in terms that are meaningful to the customer, not the provider. Creating these metrics should include both provider and customer inputs, and measurements should be taken frequently and consistently. One of the difficult lessons learned in service provision is that if the customer thinks it is a problem, then it *is* a problem.

Evaluation of any portion of Commonwealth government – or of Commonwealth government as a whole – becomes greatly simplified and objectified. An agency’s success is measured in its ability to satisfy the

requirements of its customers. The success then of enabling infrastructure – such as ITD and/or the Office of the CIO – is measured in its ability to help agencies achieve improvements against their own metrics and goals. For example, consider a customer of a government service who is dissatisfied because s/he feels that a process that currently takes several days should be able to be completed in hours. If the CIO and/or ITD were able to provide a technology solution that consistently cuts cycle time down to fewer than eight hours, they would be credited with contributing to that success. Providing solutions however that only took a few hours off of the process, or that could not *consistently* improve its performance, might not be considered successes.

In the context of the IT Commission, these service and performance metrics will measure the quality of the services provided by the central service provider. The Commission strongly recommends that all Commonwealth agencies in all branches of government examine their own service providing organizations to establish and monitor their own provision of services.

g. Drive change within the enterprise by taking a business process reengineering approach and leveraging IT for delivery improvements.

Too often, technology is seen as a panacea to problems caused by poor business practices and processes. These processes typically have developed over time, first as ad-hoc steps to accomplishing critical tasks, then later becoming institutionalized as “the way to do things.” When those processes begin to bog down and customer service begins to fail, it is easy to blame the technology and difficult to fault the process, so agencies look for newer, faster, better technology. As the new technology is put into operation, and the leadership anticipates payoff from the investment, the payoff does not materialize because adding a high-technology solution to a bad business process can only create a high-technology bad result.

As an example of this phenomenon, in one Department of Motor Vehicles (not in the Commonwealth), the process for renewal of a driver’s license included sending a notice of expiration to the driver. However, the driver was not advised in advance of any outstanding traffic or parking tickets that would prevent license renewal. Standing in line for hours at the DMV office, to arrive at the service window and be told that a renewal could not be issued, was only the first frustration for the driver. To resolve the issue, the driver had to report to a separate building, wait in line to pay the outstanding ticket, obtain a receipt, and return to the original DMV office, only to wait in line again, to finally get to the window, present the receipt, and have the license renewal processed. Due to cross-jurisdictional issues, the DMV was not authorized to accept money, so the driver now had to take a form from the DMV to a Treasurer’s clerk to pay, get a receipt, return to another line to turn

in the receipt, and wait for his/her name to be called to pick up the renewed license. When the State was considering new technology to implement in this DMV, it was discovered that, of the more than three-hour process, the new technology would save approximately ten seconds. The problem was not the technology, but a badly broken process. The technology did need replacement, as it was old and becoming unreliable, but it was NOT the cause of the long lines.

This agency, to its credit, approached the problem as a business process. The real problem with the long lines was that people were standing in the same line for the same reason multiple times. With the cooperation of the court officials, who processed the tickets, and the Treasurer's office, which accepted payments, the entire operation was examined and revised. The new technology was adjusted to support a new set of processes. Wait times were reduced, and the requirement for multiple waiting periods was eliminated.

The lesson of this example is that to gain significant improvements in customer service, both technology and business processes need to be reengineered and optimized. It is this blend of technology and business process renewal that can provide the best result for customer satisfaction. The Commission recommends that all agencies in all branches of the Commonwealth government undertake review of business processes to determine the need for business process reengineering, and that for every new IT project the business process reengineering be completed before the technology is procured to ensure that the technology is best leveraged for service improvement.

D. ARCHITECTURE & STANDARDS

The purpose of defining an enterprise architecture is to simplify decision-making given the myriad of technology choices. A properly applied enterprise architecture methodology rationalizes IT investments, reduces risk, finds best ways to extend IT, and promotes flexibility and interoperability.

As the Commonwealth has discovered, excellent technical work and documentation is the easy part. Several problem areas were cited in the “As Is” Assessment regarding Architecture and Standards:

- Lack of executive sponsorship and an enterprise focal point. Leadership is required to successfully establish an enterprise architecture and governance process.
- Governance processes have not been established and have inhibited the success of the enterprise architecture. Processes for reviewing and approving standards, setting up processes for managing compliance, evaluating waiver requests and approving exceptions, and communicating the architecture goals, processes, and standards are required. To be effective, the enterprise architecture must be incorporated into other processes like capital IT planning, procurements, and budgeting. Tools and Processes are important in documenting, defining, and designing the enterprise architecture. A clear delineation among enterprise architecture standards, enterprise infrastructure, and agency architecture is required. A framework for documenting and communicating the technical architecture standards needs to be selected and populated.
- Lack of communication regarding the enterprise architecture has led to confusion about when compliance is required.
- Architecture is a long-term investment, not a quick fix, so the implementation approach needs to be pragmatic. The architecture will be implemented slowly, on an agency project-by-project basis. Architectural compliance is a goal and there may be instances where waivers are granted to meet business objectives.
- The effectiveness of the architecture over time needs to be captured. With a practical, project-by-project approach to compliance, it is important to capture trend information to see progress in enterprise architecture adoption.

The Commission believes that establishing an enterprise architecture is a critical, first step in changing the way technology is selected and deployed in the Commonwealth, and in ensuring that individual business goals, as well as the Commonwealth’s enterprise goals, are met.

RECOMMENDATIONS

The Commission, after considering the results of the “As Is” Assessment, examining best practices, and consulting with practitioners, recommends that the Commonwealth implement the following five actions for strengthening IT architecture in Massachusetts.

a. Establish the position of Chief Technology Officer.

A proven, effective management structure includes a Chief Technology Officer to define, lead, and manage the processes to ensure enterprise architecture adoption. The management of these processes will be critical. A solely technical focus on the architecture will doom it to failure.

The qualifications of the Chief Technology Officer should not focus exclusively on technical skills and qualifications. While the Chief Technology Officer must have a solid grounding in technology, success requires skills far beyond technical competence. The Chief Technology Officer must be able to articulate business value for enterprise architecture and be comfortable dealing with diverse technical and business requirements from the vast array of agencies within the Commonwealth. Obtaining buy-in from users requires an understanding of how to promote cultural change. Experience in business and change management are essential attributes of a successful Chief Technology Officer.

The governance of enterprise architecture standards requires striking the right balance of control, in order to achieve enterprise goals without adding undue delays to project approvals. While the Chief Technology Officer should be responsible for establishing the IT architecture standards, reviewing projects to ensure compatibility with enterprise architecture goals, and developing clear oversight and enforcement mechanisms, the governance process will be important also in ensuring the right balance of control and in establishing oversight processes. The Chief Technology Officer should report directly to the CIO and should be responsible for implementing the remaining recommendations in this section.

b. Update the existing architecture within an established framework.

An enterprise architecture is a useful tool for guiding technology investments. However, the cost, benefits, and risks associated with developing a custom architecture framework would be greater than adopting and tailoring an existing framework and methodology. Adopting an already existing framework provides structure for the architecture, providing classification and organization to the complex array of technologies without that higher cost and risk.

A number of enterprise architecture frameworks already exist and are widely recognized, from which the Commonwealth of Massachusetts may choose a framework for its enterprise architecture. Those available without fees in the public sector include:

- NASCIO has developed processes and templates to guide development and adoption of an enterprise architecture.
- The Open Group has published a set of documentation on its public Web server. These may be used freely by any organization wishing to develop an enterprise architecture for use within that organization.
- The Federal Enterprise Architecture Framework (FEAF) provides direction to U.S. federal agencies for developing an enterprise architecture.

The design and implementation of an enterprise architecture is an on-going, continuous effort. The Chief Technology Officer would be responsible for directing the enterprise architecture program. As a large, on-going program, breaking the project into smaller, discrete, more manageable parts will keep the project focused and on schedule. This approach avoids the risk of becoming overwhelmed by the magnitude of a full-scale implementation.

Specifying clear deliverables and implementing the architecture in a phased approach will be important in managing the complexity and scope of the effort.

What is the value of an Enterprise Architecture Framework?

- Promote enterprise *interoperability*
- Promote agency *resource sharing*
- Provide potential for enterprise and agency *reduced costs*
- Improve ability to *share information*
- Support enterprise and agency *capital IT investment planning*

Adapted from Federal Enterprise Architecture Framework, v1.1, Sep. 1999

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- c. *Establish a governance process that obtains input from across the enterprise in establishing architecture standards.*
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The way the Commonwealth's enterprise architecture processes are managed will be a critical success factor. The extent to which agency management and CIOs comprehend, support, and assist in enforcement will be a measure of success. It is important that the architecture be viewed as a way to balance enterprise goals with agency goals, rather than as a set of constraints and roadblocks. Achieving success in the enterprise goals of reducing the variation of technologies deployed, minimizing variation in the infrastructure, and improving interoperability requires a governance structure to establish a common vision, define processes to adopt standards, and to ensure

conformance. The Commission recommends a participatory environment as a way to increase acceptance across the enterprise.

The “As Is” Assessment revealed that technical standards developed in isolation have been ignored, circumvented, or become the basis for long-standing disputes. The current ITD culture is perceived as exclusionary: decisions are made in isolation, and communicated either poorly or selectively. The “As Is” Assessment revealed frustration on the part of many individuals trying to keep up with standards that were ineffectively communicated.

Enterprise architecture is a major team activity and must integrate into other processes, such as IT procurement and capital IT planning and budgeting. The Commission believes that establishing a governance process that obtains input from and defines roles for these key areas is imperative for success. For example, the procurement office might have recommendations on how best to include the enterprise architecture standards in all technology procurements.

The governance process requires defining the processes for adopting standards, ensuring compliance, and obtaining any waivers. An Advisory Board might be beneficial to the Chief Technology Officer in establishing and enforcing the architecture standards. Similarly, a core team of architects with specialized expertise can assist in researching, proposing, and communicating architecture standards. This expertise may exist within agencies and could be leveraged by the CTO.

Realizing the benefits of an enterprise IT architecture means going beyond matters of technical design to achieving successful execution and compliance through governance. For many enterprises, this is the most difficult aspect of architecture because it requires changing ingrained behavior at every level of the business. Only an enterprise with the discipline to address outdated practices will build a successful architecture and the core business strategies that depend on it.⁷⁹

Establishing an inclusive culture, with a focus on participation and communication, will be required. The Commission recommends end-user participation in the establishment of the enterprise architecture, both its definition and its governance structure, as key to obtaining organizational buy-in.

⁷⁹ C. Young, “Organizational Issues in Building Architecture,” Gartner Note No. COM-17-5015, 18 Jul 2002.

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- d. Define objectives, incentives, and accountabilities that result in integration, implementation, and execution of common processes across “communities of interest”.*
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Agencies have been acquiring information technology solutions to further their individual agency mission, goals, and objectives. Using procurement vehicles, the acquisitions met requirements to balance suitability and cost. One factor frequently absent from consideration was the extent to which particular solutions could benefit another agency or the enterprise.

In order to move away from the traditional “stovepipe” approach, the Commission recommends employing a “community of interest” approach to planning and reviewing of information technology solutions. By the term “community of interest,” we mean those agencies and branches throughout the Commonwealth who share some interest in a business area.

For example, one community of interest may be related to the provision of child welfare services. This community might include the Executive Office of Health and Human Services, the education system, the county/municipal child welfare organizations, the Probate and Family Court Department, and any special committees the Legislature may convene on children’s issues, as well as any federal agencies who may be concerned (HHS and US Department of Agriculture, for example).

The question of “Which service delivery improvement processes can be improved by IT?” can, and should, be looked at within each program area. But, prior to funding a particular solution, the Commonwealth could benefit from determining first if the IT capability is applicable to a broader “community of interest”.

Incentives and accountabilities must also be developed in order to promote the change from traditionally isolated to collaborative planning.

States are succeeding in obtaining legislative approval to create non-reverting IT funds. In Arizona, all budget units, including the legislative and judicial branches, contribute a pro rata share to the overall cost of Arizona’s Government IT Agency’s services, and these monies do not revert to the general fund at the end of each fiscal year. Virginia’s Secretary of Technology argues that it is important to “bring the incentives to bear where people who do a good job derive a part [of the incentives]....”.⁸⁰ Virginia has proposed legislation to establish the non-reverting Virginia Technology

⁸⁰ George Newstrom.

Infrastructure Fund to reinvest future IT cost savings in enterprise technology initiatives.⁸¹

e. Leverage existing application assets by establishing an “open source” program within the Commonwealth.

The motivation behind the “open source” model is simple: promoting sharing by providing source code to programmers to minimize duplication of efforts. With “open source”, programmers have the ability to read source code and to modify it for a new purpose.

The main advantage of adopting an “open source” strategy is to reduce the Commonwealth’s reliance on a sole provider. The increased competition from multiple suppliers typically drives down costs. Therefore, the Commission recommends that the enterprise architecture reflect the “open source” concept.

Also, to provide added benefits, the Commission recommends coupling this “open source” strategy for external purchases with a “free software” exchange program within the Commonwealth. Over the years, the Commonwealth has amassed a significant inventory resulting from custom, work-for-hire engagements. For all efforts where the intellectual property rights remain with the Commonwealth, sharing the source code would

Industry has adopted a series of terms regarding software:

Proprietary - In proprietary software, the license terms are designed to protect the copyright. They are a way of granting a few rights to users while reserving as much legal territory as possible for the owner (the copyright holder). The copyright holder is very important, and the license logic so restrictive that the exact technicalities of the license terms are usually unimportant.

“Free” Software (www.gnu.org) – Free software is a matter of the users' freedom to run, copy, distribute, study, change, and improve the software. More precisely, it refers to four kinds of freedom, for the users of the software:

1. The freedom to run the program, for any purpose.
2. The freedom to study how the program works, and adapt it to your needs. (Access to the source code is a precondition.)
3. The freedom to redistribute copies so you can help your neighbor.
4. The freedom to improve the program, and release your improvements to the public, so that the whole community benefits. (Access to the source code is a precondition.)

Open Source – “Open Source” is often used when stressing aspects, such as high reliability and flexibility of the resulting program, are the primary motivations for developing such software. See http://www.dwheeler.com/oss_fs_refs.html

⁸¹ General Assembly of Virginia, Senate Bill 847, Virginia Information Technologies Agency, <http://leg1.state.va.us/cgi-bin/legp504.exe?031+ful+SB847S1>.

provide an opportunity for benefits to others. Agencies and branches, other than the one who originally paid for the code to be developed, would be given free access to the source code for use in their own areas. The CIO/CTO would maintain a library of this “free” source code for common use, forming the foundation for an enterprise reuse strategy.

So as not to burden the original developer of the software, the rules for use of the “free software” would follow some basic tenants. Specifically, the user would be given:

- 1) The freedom to run the program, for any purpose.
- 2) The freedom to study the source code to see how the program works, and adapt it to meet new needs.
- 3) The freedom to redistribute the modified source code software so the new modifications and improvements could help other agencies.

Once an agency has utilized the “free” library, they would be encouraged to check back into that library any changes they had made, so that other agencies would similarly benefit.

E. IT INFRASTRUCTURE

Commonwealth departments and agencies have operated independently to address their respective information technology needs. The “As Is” Assessment, while cursory, provided sufficient evidence that this independent approach to technology has resulted in a broad array of disparate technical solutions and infrastructure approaches.

As independent agencies in Massachusetts have sought to meet their own needs for infrastructure support, they have designed and built networks, data centers and application suites to meet their specific needs. However, because each of these areas was addressed from an internal need perspective, these separate support infrastructures are now duplicative and inefficient from an overall Commonwealth perspective. The Commonwealth needs to overhaul the infrastructure by rationalizing the current support infrastructure to combine the best features of the various components and reduce costs.

The IT infrastructure needs major attention, not only to reduce costs, but also to improve service levels and increase operational flexibility across the entire enterprise. The “As Is” Assessment of the current enterprise environment in three key areas (Applications, Networks, and Data Centers) is that the Commonwealth of Massachusetts is not capable of delivering consistent, quality online services to its customers – internal and external.

When shifting IT toward enterprise infrastructure, it is necessary to evaluate each aspect carefully to determine whether it is best delivered centrally or through individual business units. The assortment of agencies in the Commonwealth structure suggests the need for a certain amount of autonomy in IT decision making. Yet, there are several key areas where leveraging shared resources and technologies can result in savings and improved efficiencies for the Commonwealth overall. An enterprise infrastructure approach need not be an “all or nothing” approach; finding the right balance between centralization and business unit autonomy is key.

Naturally, business units may be apprehensive about losing influence and control as IT becomes more centralized. To gain their confidence, an enterprise strategy should include provisions for governance to establish unambiguous decision making processes, flexibility to meet the needs of a larger constituency, and incentives to maintain responsiveness to the business units.

Properly implemented, shared infrastructure encourages collaboration, reuse of intellectual capital, and implementation of best practices across the enterprise, which, in turn, can help increase innovation, raise quality levels, and reduce cycle time. But, most importantly, shared infrastructure can help businesses control costs. IT expenses – which were previously scattered and hidden in pockets throughout the

organization – become more visible and easier to manage, allowing the business to allocate increasingly scarce resources to the enterprise’s highest priorities.⁸²

There are potential savings when implementing a shared IT infrastructure. In a recent study of top tier financial market firms, the IBM Institute for Business Value estimated potential savings for three key infrastructure consolidation initiatives. (See table below)⁸³

Initiative	Goal	Target	Potential Savings (as a percent of IT spending)
Shared Services	Consolidate similar IT functions across multiple business units to reduce costs and improve service	Hardware Software Staff Processes Sites	4 to 6 percent
Hardware Consolidation	Review and redistribute technology components to optimize operational capability and flexibility at the lowest cost possible	Networks Storage Servers Sites	4 to 10 percent
Application Rationalization	Review and reduce a firm’s application portfolio to better align applications with business objectives and lower costs while maintaining necessary functionality and flexibility	Applications	4 to 7 percent

The Commission recommends a more thorough analysis of each of these infrastructure elements to quantify potential savings.

RECOMMENDATIONS

The Commission, after considering the results of the “As Is” Assessment, examining best practices, and consulting with practitioners, recommends that the Commonwealth implement the following six actions for strengthening IT infrastructure in Massachusetts.

- a. *Undertake consolidation and modernization of the IT infrastructure, in line with the strategic objectives and supported by an analysis of total cost versus expected benefits.*

“.... decentralization in the last decade introduced significant overlap and underutilized capacity. Caught up in the unprecedented growth of the 1990s, firms spent more freely on IT, making investments, that – in hindsight – seem

⁸² Daniel Latimore, Ian Watson, and Greg Robinson, “Restructuring Costs Rationally for Long-Term Competitiveness in Financial Markets,” IBM Institute for Business Value, Jun 2002.

⁸³ Latimore, Watson, and Robinson.

risky, and in some cases, unnecessary. Controlling IT costs was not a priority.”⁸⁴

As was identified in the “As Is” Assessment, the infrastructure in the Commonwealth is fragmented and duplicative. This fragmentation and duplication has driven the cost for supporting the infrastructure higher than it could otherwise be, and has increased the barriers to common operations of Commonwealth offices.

Potential savings accrue not only from rationalizing the technology deployed in the infrastructure. Minimizing the overall technical complexity in the infrastructure should also result in reduced support staff requirements. However, the savings expected from infrastructure consolidation cannot be realized without an investment. For example, the Commonwealth of Virginia anticipates significant long-term cost savings by consolidating the IT infrastructure. “By consolidating approximately \$450 million in annual spending on information technology, the [Commonwealth of Virginia] will generate millions in savings by eliminating redundant activities and leveraging the buying power of the state for computer hardware and software purchases. The initial stages of this reform will cost approximately \$14 million. However, this initial investment will generate more than \$37 million in savings next year, leading to net savings of more than \$23 million in Fiscal Year 2004.”⁸⁵

The Commission recommends undertaking planning for consolidation in the three infrastructure areas reviewed in the “As Is” Assessment: Applications, Networks, and Data Centers.

1) Applications

The Commonwealth should be commended for its accomplishments in the area of enterprise applications. Massachusetts is in the forefront of states in their adoption of enterprise financial and personnel management systems. The Commonwealth has proven the benefits for an enterprise approach with these systems.

The next area of focus for common business applications should be on those applications that may have cross-agency use, or which may meet the requirements of multiple agencies, and are not currently being identified. For example, multiple agencies issue licenses, but there does not exist a common

⁸⁴ Latimore, Watson, and Robinson.

⁸⁵ Mark Warner, Governor, Commonwealth of Virginia, “Managing Technology for the 21st Century,” Governor’s Reform Agenda: <http://www.gov.state.va.us/Initiatives/Legis2003/FactSheets/Tech.htm>

licensing system. The Office of Consumer Affairs is leading a collaborative effort to obtain that system, but applications such as this one should be identified to or by the CIO, and designated as enterprise applications early in the life cycle and managed appropriately. Taking this forward-leaning action will ensure that the duplicative and fragmented application suite which currently exists will be replaced over time with a coordinated suite of applications that support the Commonwealth with optimum efficiency. North Carolina, for example, has created the NC FAST project, a system that, when implemented, will combine more than 20 existing applications into one system to support eight Health and Human Services program areas statewide. NC FAST involves both the federal government and county governments in the service delivery, and includes Web interfaces for citizen access.

Even though the Commonwealth has demonstrated benefits from common business applications (HR/CMS, MMARS, Commonwealth Information Warehouse), common infrastructure applications also require some attention. ITD should be commended for its foresight and vision in promoting an enterprise approach to e-mail. The adoption has been good, but it cannot yet be considered an enterprise success. In contrast to the success of the enterprise financial and personnel management systems, migration to MassMail was voluntary rather than required.

Another area identified in the “As Is” Assessment that showed fragmentation of an enterprise strategy was in application integration. ITD is well aware of the increasing diversity and complexity of applications, as well as the resulting expense in supporting, maintaining, and integrating the mix of applications. The vision for CommBridge to address the integration of applications establishes a clear leadership position for the Commonwealth among the states in terms of a consistent application integration strategy. However, the power of CommBridge has been diluted for two reasons:

- Circumvention of the strategy over short-term cost considerations and support issues.
- Lack of application development standards and limited focus on component reuse.

Possible application areas for future consideration for an enterprise approach include document management, content management, and workflow. The lack of an enterprise approach for these types of applications often results in dramatic costs in deployment and integration, as each agency builds its own systems.

In the short term, review of agency plans in these key areas should foster common solutions. The State of Washington’s “Academy” concept might be considered for adoption. The State of Washington established a Digital

Government Applications Academy as a collaborative process to investigate potential technology solutions to business problems that were being experienced by multiple agencies. Under this model, agencies no longer experiment with new technologies and build their own systems in isolation, once an enterprise approach is deemed appropriate.

2) Data Centers

Owning and maintaining a distributed infrastructure is expensive. Each separate data center must maintain hardware; software; floor space; heating ventilation air conditioning (HVAC); a minimum headcount; and disaster recovery. Further, each data center must be sized for the peak workload it encounters. Even a small data center with one workload spike each week is, by definition, inefficient because it has so much unused capacity during non-peak times. Overall, the total consumption of resources would be considerably greater than if the infrastructure were consolidated. In most cases, the economics will justify consolidation into a common location to enable organizational streamlining or floor space reduction.⁸⁶

After merging existing data centers, additional consolidation of hardware platforms will enable even greater long-term savings. Consolidation of mainframes, if common operating systems are used, will provide more hardware and software savings. Mainframe consolidation will provide greater efficiency because it can be sized to accommodate the workload increases of all users, and will thus manage capacity efficiently. As with mainframes, savings can often be found in server consolidation: “Besides eliminating hardware costs through consolidation, support costs can be lowered as well. By shrinking the overall architectural base, IT departments have fewer systems to monitor on a daily basis, change becomes more manageable and the IT department’s ability to introduce new business capabilities may improve. When planning a hardware consolidation initiative, it is also an opportune time to revisit business continuity plans. Consolidation can make contingency plans less complex and reduce continuity-related risk.”⁸⁷

The “As Is” Assessment highlighted that the Commonwealth data centers are generally adequate, but that there are inconsistencies in operations practices, space utilization, and capacity planning. In fact, the report highlighted the single word “inconsistent” as the major characterization of the centers. Some centers are crowded, while others are underutilized. There is no consistency in hosting decisions. As a result, it is difficult to identify the true need or cost of hosting, or to determine if or when a new data center may need to be

⁸⁶ John Kost, “Government Insights: Possible IT Budget Cuts,” Gartner Note No. TG-19-0331, 6 Jan 2003.

⁸⁷ Latimore, Watson, and Robinson.

opened. Disaster recovery and continuity of operations planning is difficult because of the disparate nature of the existing centers.

Some agencies resist using central data centers because of the poor customer service reputation that the current ITD centers suffer. In addition, some agencies perceive a loss of control when considering centrally managed centers, although the RMV experience has proven these fears to be baseless. Establishing service level agreements (SLAs), funding models, and other factors mentioned in the recommendation to transform ITD to be a customer-centric IT provider (see page 108) will be key to the success of consolidation.

The Commission believes that it will be well worth the effort to consolidate since consolidating the data centers will allow for proper distribution of resources to ensure all centers are equally utilized, and will allow the Commonwealth to leverage the facilities to reduce overall costs of operations and simplify the disaster recovery and continuity of operations planning. Other states and the federal government have realized those benefits. The Department of Defense, for example, has concentrated its data processing into Mega-Centers that are shared across all branches of all three services. The combination of these centers has resulted in major savings in operational costs over the previously fragmented and disjointed processing.

3) Networks

Sun Microsystems's Scott McNealy's visionary and often quoted statement, "The network is the computer," captures the importance of the network in today's environment. Network availability is becoming more and more critical as it provides vital links between systems. The network also needs to be considered as an integral part of business continuity.

The Commonwealth networks are also fragmented and disjointed. There is no unified planning for either voice or data networks, either operationally or strategically. There are at least thirteen independent networks currently in place in the Commonwealth:

1. Criminal History Systems Board
2. Executive Office of Environmental Affairs
3. Department of Revenue
4. Department of State Police
5. Department of Transitional Assistance
6. Department of Employment and Training
7. Massachusetts District Attorneys Association
8. Registry of Motor Vehicles

9. Secretary of the Commonwealth
10. Administrative Office of the Trial Courts
11. Massachusetts Information Turnpike Initiative
12. Information Technology Division
13. University of Massachusetts

These networks do not share architecture, technology, security, or monitoring philosophy, and are only interacting with one another with significant investment of resources in making that happen. As one example of how this disjointed network approach is dysfunctional, the firewalls in the networks are of multiple brands and technologies, thereby increasing the complexity of communications across multiple networks and acting as a barrier to data access. Finally, the cost of these disjointed networks is significantly higher than it needs to be. Consolidating these networks into as few as is technically feasible, and standardizing technology such as routers, firewalls, and hubs, will significantly increase the availability and usability to the Commonwealth. This consolidation will change the networks from inhibitors to encouragers of data sharing, while at the same time reducing operational costs by decreasing the complexity of the overall architecture.

Consolidation also forms the foundation for strategic network enterprise planning. To position the Commonwealth for the inevitable convergence of voice and data networks, future upgrades of the network infrastructure must be considered in an all-encompassing manner.

Many states are in the process of consolidating their statewide network infrastructures and are projecting cost savings:

- Texas consolidated its backbone, known as TEXAN-2000, and is now reaping significant benefits as departments can cost effectively deploy statewide solutions over the shared infrastructure. Based upon the initial projection models, Texas expects a positive ROI within less than 5 years.⁸⁸
- The State of Alaska is combining 59 different telecommunications contracts into a single Telecommunications Partnering Agreement (TPA). Alaska signed a 5-year, \$92M contract with ACS, which includes telephony and video. The state plans on being "converged" by April 2003, and estimates a 5 year cost savings of \$12.9M in operating expenses and \$28.9M in capital expenses.⁸⁹

⁸⁸ Eddie Esquevel, "Unified Networks", presentation at the NASCIO 2002 Annual Conference, St. Louis, 27-30 Oct. 2002, <https://www.nascio.org/events/2002AnnualConference/index.cfm#presentations>.

⁸⁹ Esquevel.

- Indiana is the only state that has taken network consolidation to the next level by consolidating its statewide government network with its statewide education backbone. The Indiana Telecommunications Network (ITN) has increased service levels and is decreasing costs in CY03 as a result of the consolidation.⁹⁰

The factors that significantly impact the rate of the payback on convergence of voice and data networks are the speed of the migration (the faster the better), the remaining lease life on the PBXs, the extent of data network upgrades, and reduced administration costs. Another factor to consider is the ease of application deployment on converged networks.

The Commission urges an immediate review of the voice and data networks in order to determine the cost savings from an enterprise approach to consolidation.

b. Establish quality assurance and quality management practices.

The Commission recommends implementing enterprise-wide quality assurance and quality management processes and standards across the Commonwealth in order to reduce the uncertainty and risk of all projects, lower development and maintenance costs, and bring predictability to IT projects and operations. In addition, quality management strengthens the IT control framework and IT governance processes.

Although there are individual groups and projects that are adopting best practices in project management and quality assurance, there is no institutionalized approach to ensure that IT projects in the Commonwealth are consistently of high quality. The “As Is” Assessment pointed out that project success in the Commonwealth is highly dependent on the skill of the key individuals assigned to a project. In the terms of the Capability Maturity Model, the Commonwealth is at Level 1, the lowest level of maturity. At Level 1, success of organizations and projects is highly dependent on the skill and dedication of the staff assigned, and no project success can be repeated with consistency or predictability. Even if the Commonwealth achieves no more than the CMM Level 2, by the very definition of those standards, the success will be repeatable.

To make those changes, the Office of the CIO must be given oversight and quality assurance responsibility and authority for all IT projects and operations in the enterprise. A project management office should be established as part of the Office of the CIO. The project office would be responsible for ensuring that a project risk assessment has been prepared prior

⁹⁰ <http://www.in.gov/intel/networkservices/itn.html>

to initiating a major project, and would establish criteria under which at-risk projects would be compelled to contract with an outside vendor for a comprehensive project methodology review.

This project office oversight and responsibility can be formalized through the use of independent third party review of ongoing projects. For larger projects, this third party review may even include the use of formal Independent Verification and Validation (IV&V) teams or contractors to ensure that both contractors and Commonwealth organizations adhere to the processes and procedures designed to create quality and repeatability.

The State of North Carolina Information Resource Management Commission (IRMC) is required “to establish a quality assurance policy for all agency information technology projects, information systems training programs, and information systems documentation, and to establish and enforce a quality review and expenditure review procedure for major agency information technology projects.”⁹¹ In order to meet this requirement, the IRMC, through its approval of the extensions to the Quality Assurance Framework at its November 1995 meeting, established an independent and unrelated third party quality review process.

Similarly, the US Department of Agriculture implemented an IV&V process as an adjunct to the Capital Planning Investment Control (CPIC) process to provide evaluations of IT investments and implementation projects.⁹² The purpose was to establish greater uniformity in acquisition and development activities throughout USDA. Independent, outside review and monitoring of projects ensured that Department goals and QA principles and standards were consistently applied throughout the design and development of IT investments.

The Commission recommends that the Office of the CIO establish project oversight, using third-parties for larger projects in the Commonwealth, to ensure that both contractors and Commonwealth organizations:

- Adhere to the project management processes and procedures designed to reduce risk, maintain quality, and create repeatability;
- Uphold the enterprise architecture standards to promote interoperability and consistency; and
- Provide compatibility with the enterprise infrastructure.

⁹¹ The Information Resource Management Commission (IRMC) was established by N.C.G.S.143B-426.21 ratified on July 8, 1992.

⁹² U.S. Department of Agriculture, “Program and Service Delivery in the Information Age,” Enterprise Architecture Management Summary.

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- c. *Coordinate and prioritize business continuity planning of operations centrally, including both shared IT infrastructure and an enterprise approach to individual agency business applications.*
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The focus of business continuity planning does not begin with networks, applications, or systems. Rather, business continuity planning begins with identifying the availability requirements for key ***business processes*** that will keep the Commonwealth's agencies operating effectively through extreme conditions. Business impact analysis of crucial business processes, such as those dealing with flows of cash and benefits, must be completed with prioritization of what will be required during a disruption. The Commission recommends that agencies perform a business impact analysis as a precursor to disaster recovery and business continuity planning for the technical infrastructure.

Coordinating the IT disaster recovery (DR) and continuity of operations planning (COOP) planning across the Commonwealth has several immediate benefits:

1. *Risk to the Commonwealth is reduced.* If agencies who are now either not planning, or inadequately planning, for service interruptions are required to coordinate with the Office of the CIO, and if that office creates and oversees the implementation of DR/COOP planning, then the overall risk to the Commonwealth can be reduced.
2. *Cost of DR/COOP planning may be reduced.* Where agencies have world-class plans in place, along with contracted support from vendors, those resources should be leveraged to provide the Commonwealth maximum coverage for the money spent.
3. *True Business Continuity planning can be undertaken based on industry standards.* The mature state of DR/COOP is beyond just reconstitution of the information centers and restoration of the IT services. The goal should be continuity of business operations and the provision of services to the citizenry of the Commonwealth. Once the Commonwealth has ensured that all agencies have met the minimum standards for DR/COOP, as established by the Office of the CIO, the Commonwealth can begin to plan for Business Continuity, including staff continuity, facility continuity, and business operations continuity, building on the base provided by the IT DR/COOP plans.

The Commission believes that the Commonwealth would benefit from enterprise IT infrastructure planning in order to reduce "points of failure". For example, designing the network for high availability is critical because of the network-centricity of applications. The Commonwealth has several, separate networks, and might benefit greatly from leveraging these disparate

networks into a combined, high availability network. The plans for DR/COOP should cover all three aspects of IT operations: data center equipment, networks and applications/data.

d. Manage applications as a portfolio across the enterprise.

In best practice organizations, the suite of applications is managed as a portfolio of investments, similar to any investment portfolio. The definition of portfolio management is: The practice of viewing technology spending decisions as investments to achieve specific financial and business objectives. In the context of the Commonwealth, the financial and business objectives may be expressed in terms of cost savings, while the business objectives may be defined in terms of service provision to the Commonwealth and its citizens. The objective of portfolio management is to invest where the greatest value can be realized.

Portfolio management involves regular reviews of investments (dollars and resources) in order to track performance of these projects against expectations and to balance the investments in terms of size, risk, and projected payoff. Projects are reviewed regularly to make the proper business decision about the investment.

To maximize the impact of portfolio management, the Office of the CIO Project Management Office should review the portfolio centrally for all Commonwealth applications. This way, a collective view, rather than individual project or application view, can be provided. The review should ensure that IT projects align with Commonwealth agency goals and initiatives and reduce redundancy between projects. Through portfolio management, investments can be prioritized and budgets established.

Portfolio management attempts to determine the value of projects – as a measurement of project costs versus the potential financial value, risk, and business impact – then ensures there is an appropriate balance of risk/return for each one. Every application in the portfolio should be routinely and regularly reviewed for maintenance and upgrade costs, as compared to replacement/retirement costs and benefits. Every package in the portfolio should have a comprehensive plan for support in future years.

The Commission recommends an update to the Y2K inventory of mission critical applications in mission critical agencies to form the basis for the initial application portfolio.

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- e. Establish central management of IT assets within the Commonwealth and establish plans to refresh technology and update skills.*
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In today's rapid-paced technology, an IT asset as little as three years old can be totally incompatible with the newest technology. This obsolescing of equipment can create frustrations and outages for agencies and staff whose technology is oldest. As new applications and services are provided by the Office of the CIO to the enterprise, aged and obsolescent technology could leave some agencies and users behind, leaving pockets of isolation for those agencies and staff. On the other hand, changing technology too quickly can lead to excessive costs and can also serve to isolate agencies and staff if the new technology is not backwards-compatible to the central infrastructure and applications.

To avoid both of these unpleasant and wasteful situations, the Commission recommends establishing central management of IT assets within the Commonwealth, under the Office of the CIO. As the central manager of those assets, the CIO should establish technology refreshment schedules for all IT assets, including data center assets, infrastructure assets, and end-user assets, including PCs and associated peripherals in all agencies. As new technologies are introduced, the CIO will be responsible for the transformation of the Commonwealth to the new technology at a reasonable pace, ensuring that no isolated pockets are left behind. The goal of this recommendation is that technology refreshment be evolutionary, not revolutionary, within all agencies, and that the IT equipment be viewed eventually as a utility, to be provided by the central CIO organization as a tool with which the agency does its work.

The benefits of this action will be:

1. Consistency of technology refreshment across the enterprise. No pockets of old technology will be left behind.
2. Reduced labor costs. One agency noted that they had 3,000 desktops, two-thirds of which were over ten years old. The support staff required to keep the machines operational significantly diminished the IT budget available for other items. Gartner Group reports that enterprises that lacked standard hardware platforms and software configurations are realizing that supporting multiple operating systems and hundreds, if not thousands, of applications is driving up labor costs.⁹³
3. Economies of scale in buying. By combining requirements and going to the vendors for larger scale purchases, the new policy should enable

⁹³ P. Adams, IT Asset Management Is Coming of Age, May 2002

the Commonwealth to negotiate lower costs per unit and lower maintenance costs.

4. An increase in the ability to plan for new systems. Since the Office of the CIO will have an exhaustive inventory of IT assets Commonwealth-wide, the Commonwealth will be able to plan with greater accuracy for new systems and to identify the true costs of systems implementation where that implementation requires some sort of asset upgrade. As it is now, without that inventory, ITD cannot accurately estimate the impact of systemic changes.
5. Better information for business continuity planning. Desktops, printers, and other LAN equipment are often overlooked elements of business continuity planning. Central management of assets provides the accurate platform information required to support replacement of end-user equipment.
6. Improved software license compliance. The use of an asset management system, especially an automated tool, will provide details about what applications are installed, and who is and is not using the software. By tracking software license usage, it may be possible to eliminate or reduce licensing for infrequently used software, or obtain more favorable terms for software required by many agencies.

It is important to note that the IT Commission believes that formal and legal jurisdiction of the assets will remain with each agency. Planning is required to determine what IT management responsibilities will remain with agencies.

The Commission believes that the issue of planning for refreshment extends beyond technology to updating staff skills. The data center portion of the “As Is” Assessment noted that attracting and retaining technical staff with proper skills is a challenge for the Commonwealth. Because the Commonwealth is only at Level 1 of the Capability Maturity Model, the Commonwealth is dependent upon the heroic efforts of a few key talented individuals as the only way some projects and operations have been maintained. In order to protect the investment in that staff, and to broaden the technical base on which the Commonwealth depends, the staff must have their technology skills refreshed on a regular basis. This refreshment will have three direct benefits to the Commonwealth:

1. Overall skill levels will improve. By ensuring that technical staff have access to training and skills refreshment, the Commonwealth will ensure that the cadre of technicians supporting critical operations will all be at a guaranteed minimum level of proficiency. This guaranteed base of competence ensures that services can be provided under service level agreements (SLAs) at a consistent level enterprise-wide.

2. Retention of staff will improve. Technical staff often depart organizations because they do not want their skills to become outdated or to atrophy. By implementing a consistently applied policy on staff skill refreshment, the Commonwealth will increase the attractiveness of the organization and retention will improve.
3. Attraction of new staff will improve. Similar to retention, the attraction of new technical staff is highly dependent on the perception that the staff's skills will be maintained, and that opportunities will be provided for technology updating and refreshment. Taking this step will increase the attractiveness of the Commonwealth vacancies to technical staff, who are looking for new opportunities.

f. Enhance ITD to provide common infrastructure and shared services for all agencies, and offering these and other services to the judicial and legislative branches of government.

To realize maximum gain from its IT investments, the Commission believes it is imperative that the newly created Office of the CIO becomes the central IT provider for common infrastructure and shared services within the executive branch, and that it develops agreements with the legislative and judicial branches to deliver these services, and others as appropriate. Gartner maintains that "... government IT architectures that use common shared infrastructure and services are essential to improving operational efficiency and accomplishing transformation. Examples include common payment engines; identity, authentication and authorization services; common networks; shared platform services and e-mail systems."⁹⁴

Massachusetts has made great strides in developing enterprise applications that address back office functions, such as the Human Resources and Compensation Management System, MassMail, and MMARS. In a recent interview, Clark Kelso, California's CIO, commented that, "if you do not have that type of statewide infrastructure in place, you drive up the costs of almost anything else that you are trying to do on a statewide basis...." because they sit on top of those foundational elements.⁹⁵

The benefits to the Commonwealth of ITD, as the central "IT utility" provider, include centrally managed capital investments, improved reliability and availability of commodity items (data center, desktop support, network connectivity, application and server hosting), and increased ability to maintain current IT architectures. ITD, as the central provider, removes the burden of

⁹⁴ Greg Kreizman, "Sluggish Economy: Government Operational Opportunities," Gartner Research Note No. TG-15-2467, 23 Jan 2002: 2.

⁹⁵ Gamble-Risley.

infrastructure concerns, and enables agencies to focus on IT issues related to core business issues.

The Commission recognizes that the loss of control experienced by agencies will be a significant hurdle to overcome. The reluctance to allow ITD, as a third-party, to assume responsibility for enterprise infrastructure can be mitigated by implementation of the earlier recommendation to transform ITD to be a customer-centric IT provider (see page 108).



F. SECURITY (OMITTED)

This section has been removed; it is not available for public distribution.

G. PARTNERSHIPS

Technology is not only impacting the manner in which government services are being delivered in the Commonwealth, but the way in which future government organizations are organized, managed, and operated. At a time of political transition, the Commonwealth can use enabling technology to become more entrepreneurial in its management, policy-making, service delivery, and willingness to partner with other governments and the private sector. A more flexible and responsive Commonwealth government must use technology from an enterprise perspective to promote creativity, innovation, decentralized decision-making, and the elimination of fragmented and inefficient activities (i.e., must streamline and reengineer processes). The changes recommended in this report, and the partnering recommended in this section, can facilitate the achievement of whatever governmental priorities are decided upon in these fiscally austere times. In the future, responsiveness and innovation should be key drivers of change in organizational structures and management approaches for the Commonwealth.

The effective and efficient use of information is a key factor for Massachusetts to be successful in the new enterprise environment (i.e., satisfy greater demands for better and more timely, responsive, economical services). It involves processes and mechanisms for collecting, archiving, researching/retrieving, and sharing information across a myriad of public and private partners. Outdated cultures regarding the ownership and hoarding of information useful to multiple people and various organizations must be changed in order for government to meet the new service level requirements under more oppressive fiscal restraints.

A primary challenge is to employ technology not only to deliver existing services faster and cheaper, but also to make use of them for creating new enterprise services and new roles for government that enhance social progress and foster prosperity. In purchasing and implementing technology for the Commonwealth, decisions must consider not just what is needed to meet today's demands, but what will be required to satisfy future needs. This task is especially challenging, given the continuing escalation in the development of technology and the fact that government operates in an environment of constant economic, political, and social change. Without an understanding of the changing political environment and an insight into the direction technology is moving, wrong and wasteful investment decisions will be made. This is at the heart of what enterprise IT reform is seeking to address in the Commonwealth.

A smart and aggressive enterprise IT reform strategy goes beyond improving state agency operations. As one of the single largest purchasers of voice and data services in Massachusetts, state government has the potential to significantly influence the future deployment of advanced, competitive communications services and the

proliferation of Internet-based applications throughout the Commonwealth. Promoting e-government services, and incorporating economic development, education reform, and other goals (such as healthcare reform) as objectives of the long-term enterprise IT reform strategy of the Commonwealth, are critically important.

Moreover, state government and the taxpayers have a vital interest in the aggressive deployment of IT and Internet services that will address the Commonwealth's most difficult economic, social, and fiscal challenges, which include:

- Lagging economic growth in both inner city and rural areas; competitively priced broadband services are increasingly important to the recruitment and competitiveness of large and small businesses alike;
- Lack of high speed connectivity restricting availability to important government training and educational programs, such as the MCAS tutoring and remediation program;⁹⁶
- Creating a “single view of government” to citizens and businesses expecting available information and service delivery from state government, equivalent to that offered in the private sector;
- Expanding the use of Internet-based services to raise productivity and control costs in the State's healthcare system; emerging innovations in Computerized Physician Order Entry, wireless connectivity for practitioners, and other innovations will become major issues in health care reform in the months and years ahead;⁹⁷
- Promoting economic development and a business-friendly environment to assist all firms, while recognizing the special needs of small businesses and minority-owned businesses, in starting, relocating, or expanding their enterprises throughout the Commonwealth;
- Providing an integrated, cross-jurisdictional delivery of government services and information from local, state, and federal governments will be necessary if Massachusetts is to remain a leader in the new economy;
- Promoting innovative and strategic cost savings programs in health care delivery require new levels of connectivity between and among both state agencies and the provider / practitioner sectors as a whole.⁹⁸

To meet these challenges, the IT Commission advocates that the Commonwealth leverage IT infrastructure planning and consolidation, expand the job description of

⁹⁶ Massachusetts Technology Collaborative, *MTC Issue Brief*, Jan 2002.

⁹⁷ Massachusetts Technology Collaborative. *MTC Issue Brief*, Jan 2002.

⁹⁸ Charles D. Baker, Jr., “Rationalizing Health and Human Services,” Pioneer Institute for Public Policy Research, White Paper No. 20, Dec 2002: <http://www.pioneerinstitute.org/pdf/wp20.pdf>.

the new Commonwealth CIO, and charter the new IT Advisory Board to broaden IT reform to help meet these impending challenges throughout Massachusetts. For example, operating cost savings possible from e-government implementations at the state and local levels are today not effectively pursued in a collaborative manner, owing to the lack of either a consolidated network platform or a multi-jurisdictional portal development effort. The Commonwealth and cities and towns need to collaborate to unify networks and Web deployments.⁹⁹

Additionally, the Commission recommends forming innovative partnerships with the private sector to gain greater efficiency and cost savings in the use of public resources and increasing investment requirements in the Commonwealth's infrastructure. Public-Private Partnerships (PPPs) can be defined as "an arrangement of roles and relationships in which two or more public and private entities coordinate in a complementary way to achieve their separate objectives through the joint pursuit of one or more common objectives."¹⁰⁰ PPPs are already in use worldwide and can attract new private investment in the Commonwealth's IT infrastructure at a time when resources are limited but the demands for online government services are increasing.

⁹⁹ Massachusetts Technology Collaborative, Final Recommendations to the IT Commission, 14 Feb 2002.

¹⁰⁰ Trefor P. Williams, "Moving to Public-Private Partnerships: Learning from Experiences Around the World," IBM Endowment for the Business of Government, Feb 2003.

RECOMMENDATIONS

The Commission, after considering the results of the “As Is” Assessment, examining best practices, and consulting with practitioners, recommends that the Commonwealth implement the following four actions for strengthening IT partnerships in Massachusetts.

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- a. Foster public-public (i.e., federal, local, cross-jurisdictional) and public-private partnerships to provide a seamless service interface in Massachusetts.*
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Throughout the deliberations of the IT Commission, the common theme of “promoting a single face of government” was raised over and over again as members and government leaders grappled with how to make government operate more efficiently, effectively, and seamlessly at a time of declining revenues and rising budget deficits. Clearly, the availability of accurate, reliable information *and* the ability to share that information quickly, unilaterally, and seamlessly across myriad dimensions of government, business, and the public are critical for the future of the Commonwealth. An enterprise IT framework that leverages public and private sector resources has the potential to be *the* key enabler to creating the next generation of government services. Consolidation and modernization of the Commonwealth’s IT infrastructure can derive tax dollar efficiencies, but also the extension of the strategic power of the State’s network in order to leverage economic development, via telecom infrastructure investment and e-government portal initiatives.

It is important to note that the Commonwealth’s successful migration to enterprise management and online government will be as much about cultural change and risk management as finding the right technology. This dramatic change will require more than having a high level vision and enterprise rhetoric. Sound, aggressive leadership and training will be required to ensure that the public sector workforce is ready to meet the challenges ahead by streamlining processes and removing bureaucratic barriers.

To attain a “single view of government,” the Commonwealth needs to leverage its current e-government efforts and take IT to the next level. Although much progress has been made through Mass.Gov initiatives, Commission members recognized that expanding e-government services ubiquitously at both the local and state government levels faces many challenges and opportunities. Building an enterprise e-government vision, financing new applications, expanding shared technical infrastructure, and funding ongoing operations all must occur. In a time of severe budget shortfalls, e-government should be viewed as a way to economically deliver

better services to the Commonwealth's constituents at all levels of government.

The economy of Massachusetts is driven by information and businesses that rely on fast and accurate information to stay competitive in the new global marketplace. The Department of Economic Development (DED) has done an excellent job in providing online resources to help firms make informed business decisions and keep abreast of trends, locally and nationally. Through the *Mass.Gov* portal, businesses looking to locate or expand will find links to dozens of organizations and documents, and obtain information easily. For example, *MassBedrock* is an online digital library consisting of several tools to assist firms in identifying and retrieving business information from a database of resources and an information directory.¹⁰¹ The access to information must intensify if business development is going to grow throughout all regions within the Commonwealth. Providing information beyond the public sector domain, and connecting prospective businesses' clients to private sector resources, generate the need for unique partnerships.

Given the increased complexity of information technology, and the need to expand the influence of the enterprise, the IT Commission recommends the Commonwealth:

1) Form public/public partnerships to effectively leverage and manage the Commonwealth's technology resources and focus on developing a seamless interface to government services.

A primary challenge is to employ technologies, not only to deliver existing services faster and cheaper, but also to make use of them to create new services and new roles for government to enhance social progress and foster prosperity throughout the Commonwealth.

2) Develop innovative partnerships with the federal government to streamline programs and leverage technology to deliver services in a cost effective and citizen-centric manner.

Federal grant and loan assistance programs typically severely restrict or prohibit significant coordination and streamlining of delivery in multi-jurisdictional projects and services. All federal grant and loan funds' policies and regulations should be structured to allow for the use of such funds in ways that streamline processes and improve government efficiencies. The Romney Administration should assemble representatives from federal, state, and local government agencies, with quasi-government and non-profit organizations, to address barriers in streamlining processes

¹⁰¹ <http://www.massbedrock.com/indexf.html>

and removing legal and cultural barriers to efficient and effective program delivery.

One of the areas where an innovative federal partnership should be explored resides in the area of homeland security. Massachusetts is fully capable of establishing itself as a leader in the competitive processes for receipt of new domestic security federal funds, from the Homeland Security Department (HSD) and from other federal agencies and programs. IT reform efforts underway by the IT Commission are occurring at a coincidentally appropriate time, providing the Commonwealth an opportunity to leverage federal funds for 'dual use' new network deployments.¹⁰²

Potential program areas to explore include:

- *First Responder* - Funding for first responder communications interoperability.
- *Secure Local State Networks* - New funds for federal priority access and linkage to state / local secure networks.¹⁰³
- *Intelligent Highway Systems* - The security oriented 'repurposing' by the Federal Highway Administration and Homeland Security Department of intelligent transportation systems (ITS) now installed, and now being planned for deployment, in the limited access highway corridors of the Commonwealth maintained by MassHighway and MassPike.¹⁰⁴
- *Research Computing* - Significant increases (in FY '03 and '04 budgets) for the funding of intelligence and research line items for supercomputing and terrascale networking. These funds can greatly enhance in-state supercomputing resources managed by our leading academic institutions. Improved networked supercomputing assets in Massachusetts will further add to the competitive advantage the Commonwealth holds in biotechnology and other high growth sectors that require high performance computing.¹⁰⁵

The Commonwealth should also work to maximize federal dollar inflow into the Commonwealth available from the E-Rate Schools and Libraries program administered by the Federal Communications Commission. The Commonwealth should organize a community of interest comprised of

¹⁰² Massachusetts Technology Collaborative, Final Recommendations to the IT Commission, 14 Feb 2002.

¹⁰³ Information Week. "Feds Weigh Establishment Of Interstate Communications System," 28 Oct 2002:
<http://www.informationweek.com/story/TWK20021028S0005>

¹⁰⁴ Massachusetts Technology Collaborative, Final Recommendations to the IT Commission, 14 Feb 2002.

¹⁰⁵ Bruce P. Mehlman, Assistant Secretary of Commerce for Technology Policy, "Biotechnology, Pervasive High Speed Computing Networks and American Competitiveness in the Age of Innovation," 5 Dec 2002.

municipal schools and libraries, the state Department of Education (DOE), the Massachusetts Board of Library Commissioners, and ITD to leverage investments and maximize the overall impact of funding.¹⁰⁶

3) Facilitate cross-agency cooperation and partnership with quasi-public groups to support Commonwealth economic development organizations throughout the State to provide expanded services and resources to new and expanding businesses.

The Commonwealth's economic development community is well positioned to go to the next level in offering better-coordinated services and resources to new and emerging businesses looking to grow in Massachusetts. As outlined in the DED's *Toward a New Prosperity*, the IT Commission supports the goals of creating a strategic focus and coordination among economic development agencies and quasi-public organizations for marketing and outreach activities. The Commonwealth should develop communities of interest as focal points for these partnerships. An excellent example of an evolving partnership in economic development is MassConnect. MassConnect is in the beginning stages of offering seamless, comprehensive access to economic development resources throughout the Commonwealth. MassConnect ultimately will provide businesses with an efficient marketplace. In time, businesses will be able to use the site to identify and work with customers, service providers, and development partners. The goal of MassConnect will help to foster collaboration among the technical assistance resources within the economic development community. Ultimately, the goal of MassConnect will be to link private and public resources through a shared Economic Development Network and a "virtual business agency" through Mass.Gov.¹⁰⁷

b. Strengthen partnerships to expand infrastructure, creating more ubiquitous access to technology throughout the Commonwealth.

Massachusetts is home to several of the most information intense clusters of businesses and institutions on the planet – the capital of the global mutual fund industry, the single greatest concentration of biotechnology innovation, an array of leading research universities, venture capital fueled software development and communications equipment firms, and world-renowned teaching hospitals. By successfully partnering with selected firms and institutions from among these drivers of immense network bandwidth and of

¹⁰⁶ Massachusetts Corporation for Educational Telecommunications (MCET), <http://www.mcet.edu>.

¹⁰⁷ Commonwealth of Massachusetts, Department of Economic Development, [MassConnect](#).

IT innovation, the Commonwealth will gain cost advantage via scale economies.¹⁰⁸

Public government entities at all levels have traditionally built upon their own support structures to deliver services and meet their statutory mandates. Given the downward pressures of budget demands, and the upward pressures of constituent needs and expectations, Commonwealth agencies and local governments can no longer do it by themselves. Government agencies and jurisdictions need to partner by pooling and sharing resources.¹⁰⁹

Additionally, the private sector needs to explore partnerships to extend ubiquitous service in arrangements with the Commonwealth where they share in the risk and the reward. Expanding the use of cooperative public-private and networked solutions to meet public needs should be encouraged throughout government. This approach is pragmatic in times of scarce budget dollars and the need to extend the benefits of educational opportunities, drive efficiencies, improve performance, and realize the priorities of the new Administration.

High-speed connectivity has emerged as a critical element of the infrastructure on the new knowledge-based economy. As highlighted in the *Toward a New Prosperity* economic development strategic plan, “As good roads and access to affordable electric power is essential to the economic success of businesses and regions, the same can now be said about access to affordable high-speed Internet (or broadband) services.”¹¹⁰

As stated in a Massachusetts Technology Collaborative Issue Brief, “An accessible and robust public telecom infrastructure is the *sine qua non* for many firms, and the entire economic sectors and industry verticals, attempting to locate in the Commonwealth.”¹¹¹ A number of state models have emerged regarding more ubiquitous access to technology. They include:

- *The State of Pennsylvania Keystone Communication Project* is a network consolidation strategy linked to a statewide anchor tenant strategy. The project allows private sector traffic to “transit” state network elements.¹¹²

¹⁰⁸ Massachusetts Technology Collaborative, Final Recommendations to the IT Commission, 14 Feb 2002.

¹⁰⁹ Center for Digital Government, Citizen 2010: Leading for Results, Governing Through Technology, Feb 2003.

¹¹⁰ Commonwealth of Massachusetts, Department of Economic Development, *Toward a New Prosperity: Building Regional Competitiveness Across the Commonwealth*, Oct 2002: 126.

¹¹¹ Massachusetts Technology Collaborative, Telecommunications and the Economic Development Infrastructure of Massachusetts, MTC Issue Brief, Dec 2002.

¹¹² Massachusetts Technology Collaborative, Telecommunications and the Economic Development Infrastructure of Massachusetts.

The project may be reviewed at:

<http://www.keycomm.state.pa.us/keycomm/site/default.asp>

- *The LinkMichigan Program* has recently achieved national attention for its focus on economic benefits of ubiquitous passage of a legislative initiative that creates both tax incentives for carriers deploying broadband infrastructure, and a state local right-of-way (ROW) policy mandate on municipalities.¹¹³ The project may be reviewed at: <http://medc.michigan.org/cm/attach/9ABEB18E-D404-4A4A-A6A2-40E73280F6D9/LinkMichigan%20Presentation%20112001R%20Gartner.pdf>
- *The Commonwealth of Virginia*, in its Strategic Plan for Technology 2002-2006, has identified broadband connectivity as a core component of its “One Virginia” Plan, which seeks to include every region in the State’s technology based economic growth. Virginia has identified which state agencies and organizations are currently responsible for delivering networked services for education, small businesses and localities, and state agencies and other public bodies.¹¹⁴
- *ECom-Ohio* completed its third year of measuring Ohio businesses’ and citizens’ ability to deploy the new tools of electronic commerce. ECom-Ohio uses benchmarks based on those developed by the Computer Systems Policy Project in 1998. Ohio is the first state in the country to take on the challenge of using these benchmarks to systematically assess its readiness for global electronic commerce. ECom-Ohio is setting an aggressive, results-oriented Information Technology Agenda statewide for Ohio. The project may be review at: <http://www.ecom-ohio.org/>¹¹⁵
- *The Rural Internet Access Authority* is leading [e-NC](http://www.e-nc.org/), a grassroots initiative to link all North Carolinians – especially those in rural areas – to the Internet. The authority was created on August 2, 2000, by the North Carolina General Assembly, and has a life span of three years. A 21-member commission guides the work of the authority through educational and technical initiatives, which are designed to increase Internet usage across the State.¹¹⁶

Massachusetts has also been active in addressing issues regarding more ubiquitous access to technology. The MassBroadband Initiative, a joint initiative sponsored by the Massachusetts Software and Internet Council and

¹¹³ Massachusetts Technology Collaborative, [Telecommunications and the Economic Development Infrastructure of Massachusetts](#).

¹¹⁴ Massachusetts Technology Collaborative, [Telecommunications and the Economic Development Infrastructure of Massachusetts](#).

¹¹⁵ ECom – Ohio, <http://www.ecom-ohio.org>

¹¹⁶ State of North Carolina, Rural Internet Access Authority, <http://www.e-nc.org/about.shtml>

the Massachusetts Technology Collaborative, was established to promote the continued deployment of broadband services throughout the Commonwealth. The initiative started in 2000 and convened an Advisory Committee drawn from academia, local and state governments, and economic development groups around the State. (www.massbroadband.org)¹¹⁷

1) The IT Commission recommends serious consideration be given to enterprise infrastructure throughout the Commonwealth of Massachusetts.

The eight recommendations in the MassBroadband Initiative Report may provide a basis for the Commonwealth to begin strengthening this area.¹¹⁸ These recommendations include:

- **Aggregation:** Customer aggregation projects should be encouraged and facilitated by economic development organizations.
- **Internet2:** State economic development organizations and industry should work closely with the Internet2 projects of the State's research universities to encourage spin-off or spill-over effects from Internet2 infrastructure, and of new Internet applications developed under the Internet2 program.
- **Public Sector Telecom Procurement:** State government should take a new look at streamlining the telecom procurement process in order to cut costs, improve interoperability, expand e-government, and make public sector "anchor tenants" available for local customer aggregation efforts.
- **Cable Modem Internet & Residential/Small Office-Home Office:** Local cable TV committees should explore the advantages of regional or multi-town franchising agreements that will give providers a single, large investment target to make new capital investments in cable modem Internet service, or competing forms of service, such as DSL.
- **Local Right-of-Way and Pole Conduit Policies:** New materials providing guidelines and background on best practices should be developed to encourage the State's municipalities to adhere to uniform, non-discriminatory practices relative to telecom providers' access to local right-of-ways, poles, and conduits.

¹¹⁷ Massachusetts Software & Internet Council and Massachusetts Technology Collaborative, Mass Broadband: A Broadband Roadmap for Massachusetts, Jun 2002: 2.

¹¹⁸ Massachusetts Software & Internet Council and Massachusetts Technology Collaborative, 5-6.

- **Metrics:** State regulators, academics, and Internet users in Massachusetts need to develop new metrics that will track and evaluate the deployment of broadband connectivity throughout Massachusetts.
 - **Cell Towers and Wireless Systems:** State policy makers and industry representatives should fully support the ongoing efforts of the State Department of Consumer Affairs & Business Regulation, the Massachusetts Municipal Association, and the wireless industry to develop a streamlined, non-adversarial approach to tower siting and the appeal of local siting decisions.
 - **An Ongoing User Forum:** The Commonwealth, industry groups, and economic development organizations should create an ongoing user forum to identify key issues relative to broadband deployment in the State, and develop new pro-deployment strategies from time to time.
- 2) **The Commission further recommends that the Commonwealth continue to expand and leverage existing communications infrastructure partnerships throughout government with such entities as higher education.**

A good example of an existing partnership is the Massachusetts Information Turnpike Initiative. This effort installed dark fiber along the Massachusetts Turnpike for shared use by the State (ITD) and the University of Massachusetts (UMass). The university lights the fiber at OC-192, which provides 10 GB of bandwidth, serving as the backbone between UMass campuses and between community colleges in Massachusetts, and also provides video conferencing. UMass won the community college services by competing and winning an open, competitive RFP to provide Internet access for community colleges, and provides “very stable” service. Other examples include:

- UMass also provides Internet services to the Massachusetts Public Library consortium and limited state agency regional office connectivity. With all these services already traveling on their backbone, UMass still believes they have plenty of capacity to serve as a backbone statewide.
- Massachusetts Corporation for Educational Technology (MCET) was a quasi-public authority that was in existence from August 1999 through October 2001. It was funded with \$9 million in state funds, and tasked with implementing a self-supporting statewide education network.

More of these initiatives need to be encouraged throughout the Commonwealth through the “community of interest” framework.

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- c. Maximize investments to serve the needs of all levels of government, particularly cities and towns, by leveraging partnerships and common, standard solutions.*
-

Digital government needs strong leaders with a clear vision of the future from all levels of government, and must leverage resources and expertise. As stated in the NC E-Government report, “...All government employees must be part of the reform process, available funds must be spent more efficiently on technology, and new ways for funding must be realized.”¹¹⁹

Throughout the deliberations of the IT Commission, members expressed the need for the Commonwealth to leverage enhanced IT performance beyond the traditional state agency framework and explore ways to expand the “enterprise” to enhance government services throughout Massachusetts. At a time of declining budget and a challenged economy, the new Administration is looking for ways to generate savings and deliver services efficiently and effectively for local governments, health and human services, transportation, and education programs.

The concept of e-government is becoming more widespread and governments are recognizing the opportunity to provide better service to the public without increasing their cost of operation. Governments are studying the possibility of gaining much-needed revenue through leveraging state funds and promoting public/private partnerships to provide more service online.

It is clear that the technologies associated with enterprise e-government have enormous potential to improve the delivery of public services, and to transform the manner in which government interacts with its citizens, businesses, and employees, particularly at the local government level. However, most government entities at both the state and local levels have been challenged to keep pace technically with the world around them, and cannot maximize the overall benefits that the enabling technology has to offer in improving government operations.

According to recent studies, governments could save billions if they handled more of their business over the Internet. Individuals and firms conduct approximately \$600 billion a year in government transactions. Less than 1% of IT currently takes place online. In addition, these studies estimate that

¹¹⁹ State of North Carolina, Information Resource Management Commission, E-Government: Using Technology to Transform North Carolina’s Government Services and Operation in the Digital Age, Report for the NC General Assembly, Jan 2001.

every in-person or phone transaction converted to an online transaction saves government between \$40 and \$400 in paper and staff costs, which represents, according to other estimates, a 70% savings.¹²⁰

The Commonwealth needs to form a partnership with local governments to meet the challenges of e-government in a cost-effective manner. By using an enterprise perspective, local government could leverage the work of *Mass.Gov* and build e-government applications faster, more economically, and with better results. Where possible, local government agencies and programs should be encouraged to coordinate technology investments and resources that can be used by other local governments. As a result, aggregation of demand lowers purchase prices, and economies of scale reduce unit costs. In addition, specialized, scarce, and expensive resources that are not affordable by local government organizations or initiatives can be made available by combining funding sources and sharing resources.

The aggregating of similar e-government transactions from local government with Commonwealth agencies through common technical resources, and built to common standards, spreads the fixed costs of this infrastructure over high volumes to reduce unit costs long-term. In addition, reusable technical components should be made available to local government for the creation of e-government applications to reduce redundancy and increase reliability of processing. Common business and technical models, best practices, and best procedures should be shared with the local government community to the greatest extent possible to leverage past experiences.

d. Maximize private sector expertise and service to efficiently and effectively deliver government services.

Many Commonwealth agencies operate their various programs and services in a rigid environment, based on the flow of public monies and confined to organizational structures that have been in place for many years. These “silos” have been legally and culturally mandated to accomplish their public purpose objectives without incentive to cooperating across agency or multi-jurisdictional boundaries, much less across different branches of government, or with the private and non-profit communities. These silos continue to be a barrier for the Commonwealth to deliver enterprise services efficiently and effectively, especially at a time of declining budgets and increased constituent demands.

The private sector has a great deal to offer the Commonwealth as it seeks to deliver government services in an efficient and effective manner. The economies of scale available in the private sector for performing the same IT

¹²⁰ State of North Carolina, Information Resource Management Commission.

services may enable the State to buy these services cheaper than the Commonwealth can implement using internal resources. For major Commonwealth IT initiatives or projects, the start-up time using internal sources is too long. Also, start-up-funding sources are limited in the present government fiscal environment - there are many demands for scarce funds.

The IT Commission recommends:

1) Utilizing the private sector for thought leadership and lessons learned in the enterprise management of technology.

The private sector has played a critical role in the IT Commission and provided valuable insight and ideas on how to move enterprise IT reform forward. While government is not the private sector, there are a number of management practices that have applicability to the public sector. The Commonwealth, through the IT Advisory Board, should create forums for the private sector to share thought leadership on a variety of topics, including new and emerging technology, procurement, process improvement, and enterprise IT management. Additionally, a number of private sector firms have endowments and non-profit institutes that may offer useful information to the Commonwealth. The Commonwealth should avail itself of this information sharing and best practice information.

2) Exploring service delivery partnerships with the private sector when it makes economic sense.

Utilizing the private sector must also be considered and explored in an effort to bring efficient and cost effective delivery models for enterprise IT services to the Commonwealth. Governments at all levels throughout the world are exploring various types of PPPs to deliver services and build out physical and IT infrastructure. Those models are more commonly used for large capital projects such as buildings and highways, but might have relevance in addressing IT infrastructure needs in the future. The models include:

- Build-Operate-Transfer (BOT) - Under this type of arrangement, a concession is made for the contractor to design, finance, operate, and maintain a facility or service for a period of time exceeding 10 years, and the contractor charges tolls or fees to recoup the cost of the project. There are many variations to the BOT model.
- Design-Build – This model allows a contractor to design and build services. This is usually through a performance-based contract and is

primarily used with new buildings and highways. The contractor warranties the work and maintains it for a specified period of time.

- **Design-Build-Finance-Operate (DFBO)** – This model is currently in use in Great Britain and differs from BOT in that tolls or fees are not charged. Government pays for the service through a pre-determined formula based on usage. The contractor is responsible for maintenance and operation.¹²¹

For the Commonwealth to explore this new policy arena, procurement and existing laws will need to be reviewed and consensus gained from political stakeholders to move to this new model of service. As the Commission looks at effective ways to deliver enterprise IT services, the Commonwealth should explore ways to work with the private sector to deliver services.

Before entering into such arrangements, the Commonwealth should evaluate lessons learned from other government bodies. The National Council for Public-Private Partnerships is a non-profit organization of public- and private sector practitioners that collaborate on the delivery of services and/or infrastructure to meet public needs. They advocate that there are five critical components of any successful PPP. While there is not a set formula or an absolute foolproof technique for crafting a successful PPP, each of these components is involved to varying degrees.¹²²

- **Leadership:** A successful partnership can result only if there is commitment from "the top". The most senior public officials must be willing to be actively involved in supporting the concept of PPPs, and taking a leadership role in the development of each given partnership. A well-informed political leader can play a critical role in minimizing misperceptions about the value to the public of an effectively developed partnership. Equally important, there should be a statutory foundation for the implementation of each partnership.
- **Public Sector Involvement:** Once a partnership has been established, the public sector must remain actively involved in the project or program. On-going monitoring of the performance of the partnership is important in assuring its success. This monitoring should be done on a daily, weekly, monthly, or quarterly basis for different aspects of each partnership (the frequency is often defined in the business plan and/or contract).
- **A Well Thought-Out Plan:** You must know what you expect of the partnership before hand. A carefully developed plan (often done with the assistance of an outside expert in this field) will substantially

¹²¹ Trefor Williams.

¹²² National Council for Public-Private Partnerships, <http://www.ncppp.org>.

increase the probability of success of the partnership. This plan most often will take the form of an extensive, detailed contract, clearly describing the responsibilities of both the public and private partners. In addition to attempting to foresee areas of respective responsibilities, a good plan or contract will include a clearly defined method of dispute resolution (because not all contingencies can be foreseen).

- **Communications with Stakeholders:** More people will be affected by a partnership than just the public officials and the private-sector partner. Affected employees, the portions of the public receiving the service, the press, appropriate labor unions, and relevant interest groups will all have opinions and, frequently, significant misconceptions about a partnership and its value to all the public. It is important to communicate openly and candidly with these stakeholders to minimize potential resistance to establishing a partnership.
- **Select the Right Partner:** The "lowest bid" is not always the best choice for selecting a partner. The "best value" in a partner is critical in a long-term relationship. A candidate's experience in the specific area of partnership being considered is an important factor in identifying the right partner.